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Copr. 1911, J. C. W. Co. AMERICAN TREE LEAVES, FLOWERS AND FRUITS

1. White pine. 2. Shellbark hickory. 3. Red spruce. 4. Incense cedar. 5. Hemlock. 6. Black walnut. 7. Redwood. 8. Chestnut. 9. Cottonwood. 10. River birch.

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KEY TO PRONUNCIATION

Three methods are used to indicate the pronunciation of the words forming the headings of the separate articles:

(1) By dividing the word into syllables, and indicating the syllable or syllables to be accented. This method alone is followed where the pronunciation is entirely obvious. Where accent marks are omitted, the omission indicates that all syllables are given substantially the same value.

(2) Where the pronunciation differs from the spelling, the word is re-spelled phonetically, in addition to the accentuation.

(3) Where the sound values of the vowels are not sufficiently indicated merely by an attempt at phonetic spelling, the following system of diacritical marks is additionally employed to approximate the proper sounds as closely as may be done:

ā, as in *fate*, or in *bare*.
ä, as in *alms*, Fr. *âme*, Ger. *Bahn*=*â* of Indian names.
â, the same sound short or medium, as in Fr. *bal*, Ger. *Mann*.
a, as in *fat*.
ą, as in *fall*.
ə, obscure, as in *rural*, similar to *u* in *but*, *ė* in *her*: common in Indian names.
ē, as in *me*=*i* in *machine*.
e, as in *met*.
ė, as in *her*.
ī, as in *pine*, or as *ei* in Ger. *Mein*.
i, as in *pin*, also used for the short sound corresponding to ē, as in French and Italian words.
eu, a long sound as in Fr. *jeûne*,= Ger. long *ö*, as in *Söhne*, *Göthe* (Goethe).
eu, corresponding sound short or medium, as in Fr. *peu*=Ger. *ö* short.
ō, as in *note*, *moan*.
o, as in *not*, *frog*—that is, short or medium.
ö, as in *move*, *two*.
ü, as in *tube*.
u, as in *tub*: similar to *ė* and also to *a*.
ų, as in *bull*.
ü, as in Sc *abune*=Fr. *û* as in *dû*, Ger. *ü* long as in *grün*, *Bühne*.
û, the corresponding short or medium sound, as in Fr. *but*, Ger. *Müller*.
oi, as in *oil*.
ou, as in *pound*; or as *au* in Ger. *Haus*.

The consonants, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, and z, when printed in Roman type, are always given their common English values in the transliteration of foreign words. The letter c is indicated by s or k, as the case may be. For the remaining consonant sounds the following symbols are employed:

ch is always as in *rich*.
d, nearly as *th* in *this* = Sp. *d* in *Madrid*, etc.
g is always hard, as in *go*.
h represents the guttural in Scotch *loch*, Ger. *nach*, also other similar gutturals.
ṇ, Fr. nasal *n* as in *bon*.
r represents both English *r*, and *r* in foreign words, in which it is generally much more strongly trilled.
s, always as in *so*.
th, as *th* in *thin*.
th, as *th* in *this*.
w always consonantal, as in *we*.
x = ks, which are used instead.
y always consonantal, as in *yea* (Fr. *ligne* would be re-written lēny).
zh, as *s* in *pleasure* = Fr. *j*.

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VOLUME X

T, the twentieth letter in the English alphabet, a sharp mute consonant, representing the sound produced by a quick and strong emission of the breath after the end of the tongue has been placed against the roof of the mouth near the roots of the upper teeth. By Grimm's Law *t* in English corresponds to *d* in Latin. Greek and Sanskrit, and to *ss* or *s* in German.

Taasinge (tō'sing-ē), an island of Denmark, south of Funen; area, 29 square miles. Pop. 4035.

Tabanus (tab'a-nus). See *Gad-fly*.

Tabard (tab'ard), a sort of tunic of the middle ages, worn over the armor, and generally embroidered with the arms of the wearer, or if worn

Tabard, Sir John Cornwall, Ampthill Church, Beds.

by a herald, with those of his lord or sovereign. It still forms a part of the official dress of heralds.

Tabasco (tȧ-bȧs'kō), a state of Mexico, between Yucatan Peninsula and Vera Cruz; area, 10,072 square miles. The surface consists almost entirely of a great flat, sloping northwards to the Gulf of Mexico. A large portion of the state is still covered with primeval forests. The inhabitants are chiefly Indians. The capital is San-Juan-Bautista. Pop. of the state, 159,834.

Tab'asheer, or TABASHIR (Persian), a siliceous concretion resembling hydrophane, sometimes found in the joints of bamboos and other large grasses. It is highly valued in the East Indies as a medicine, but its virtues are merely imaginary.

Tabby (tab'i), the name given to stuffs watered or figured by being passed through a calender, the rollers of which, bearing unequally on the stuff, render the surface unequal, so as to reflect the rays of light differently, and produce the representation of waves. Silks treated in this way are called *moiré*.

Tabernacle (tab'er-na-kl), in Jewish antiquities, the tent or sanctuary in which the sacred utensils were kept during the wanderings of the Israelites in the desert. It was in the shape of a parallelogram, 45 feet by 15, and 15 feet in height, with its smaller ends placed east and west, and having its entrance in the east. Its framework consisted of forty-eight gilded boards of shittim-wood, bound together by golden rings and set into silver sockets; and this framework was covered with four carpets. The interior was divided by a curtain into two compartments, the outer the 'sanctuary' proper, and the innermost the holy of holies. In the sanctuary was placed on the north the table of showbread, on the south the golden candlestick, and in the middle, near the inner curtain, the altar of incense. In the center of the holy of holies stood the ark of the covenant. The tabernacle was situated in a court 150 feet by 75, surrounded by costly screens 7½ feet high, and supported by pillars of brass 7½ feet apart, to which the curtains were attached by hooks and fillets of silver. In the outer or eastern half of the court stood the altar of burnt-offering, and between it and the tabernacle itself the laver, at which the priests washed their hands and feet before entering the sanc-

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tuary. It was superseded by the temple at Jerusalem.

Tabernacle, in ecclesiology, an ornamented receptacle in which the host is kept on the altar; also a reliquary.

Tabernacles, FEAST OF, the last of the three great festivals of the Jews which required the presence of all the males in Jerusalem. Its object was to commemorate the dwelling of the Israelites in tents during their sojourn in the wilderness, and it was also a feast of thanksgiving for the harvest and vintage. The time of the festival fell in the autumn, when all the chief fruits were gathered in, and hence it is often called the feast of the ingathering. Its duration was strictly only seven days, but it was followed by a day of holy convocation of peculiar solemnity. During the seven days the people lived in booths erected in the courts of houses, on the roofs, and in the court of the temple. It was the most joyous festival of the year.

Tabes (tā'bēz), a term formerly applied to a disease characterised by a gradually progressive emaciation of the whole body, accompanied with languor, depressed spirits, and, for the most part, imperfect or obscure hectic fever, without the real cause of the affection being properly localized or defined.—*Tabes mesenterica*, abdominal phthisis, or consumption of the bowels, is a disease of the bowels caused by the formation of tubercles similar to those of the lungs in ordinary consumption. It causes extreme wasting, feebleness, and thinness of body, and recovery is rare.—*Tabes dorsalis* is the same as *locomotor ataxy* (which see).

Tabinet (tab'i-net), a rich fabric consisting of a warp of silk and a weft of wool, employed for window curtains and other furniture purposes.

Table, ROUND. See *Round Table*.

Tableaux Vivants (tab-lō vē-vāṅ; French = 'living pictures'), representations of scenes from history or fiction by means of persons grouped in the proper manner, placed in appropriate postures, and remaining silent.

Table-land, or PLATEAU (pla-tō'), a flat or comparatively level tract of land considerably elevated above the general surface of a country. Being in effect broad mountain masses, many of these plateaus form the gathering-grounds and sources of some of the noblest rivers, while their elevation confers on them a climate and a vegetable and animal life distinct from that of the surrounding lowlands. In Europe the chief table-lands are that of Central Spain, the less-defined upland in Switzerland, and the low plateaus of Bavaria and Bohemia. In Asia is the most extensive table-land in the world, the sandy rainless Desert of Gobi, nearly 400,000 square miles; also the loftiest inhabited table-land in the world, that of Tibet, with an elevation of from 11,000 to 15,000 feet. In Africa are the plateaus of Abyssinia, and the karoos or terrace plains of South Africa. In America the great table-lands are those of Mexico and the Andes. The table-lands of the Western United States are of large extent, comprising much of the states of Colorado, Utah, Oregon, Washington, and Idaho, with considerable portions of other states.

Table Mountain, a mountain of South Africa, south of Table Bay, its highest point being right over Cape Town. It is about 3500 feet high and level on the top. It joins the Devil's Mount on the east, and the Sugar Loaf or Lion's Head on the west.

Table-turning, one of the phenomena of spiritualism, in which a number of persons sit around a table, with hands or fingers touching it, the result in many cases being a tipping or other movements of the table, questions asked being frequently answered by responsive tips indicating 'yes' or 'no.' The phenomenon has been ascribed to involuntary muscular action of the sitters, but in view of the fact that the table is occasionally lifted bodily from the floor, while touched only on its surface, this explanation seems insufficient. The agency at work is claimed to be that of spiritual beings, but further investigation is needed before any decision in this problem can be reached.

Taboo, or TABU (ta-bō'), a peculiar institution formerly prevalent among the South Sea islanders, and used in both a good and bad sense — as something sacred or consecrated, and as something accursed or unholy — both senses forbidding the touching or use of the thing *taboo*. The idea of prohibition was always prominent. The whole religious, political, and social system of the primitive Polynesians was enforced by the taboo, the infringement of which in serious cases was death.

Tabor (tā'bur), a small drum, beaten with a stick, and used as an accompaniment to a pipe or fife.

Tabor (tā'bur), a remarkable hill of Northern Palestine, rising abruptly in the shape of an almost perfect cone from the plain of Esdraëlon to

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a height of nearly 1000 feet. It is clothed with woods to the very summit, where a view of immense extent is obtained. Its isolation led the earlier ecclesiastics to make it the scene of the transfiguration; but the historical data which we possess show that its summit was employed without intermission from 218 B.C. till 70 A.D. as a stronghold.

Tabor, (tā'bor), a town of Bohemia, on an eminence above the Luschnitz, 48 miles S. S. E. of Prague, with old walls and towers. Its castle was a stronghold of the sect of Hussites called Taborites, and makes a conspicuous figure in their history. Pop. 10,703.

Taborites. See *Hussites.*

Tabreez, or TABRIZ (tä-brēz'; the ancient *Tauris*), a city of Persia, capital of the province of Azerbijan, on the Aigi, 36 miles above its entrance into Lake Urumia. It lies at the inner extremity of an amphitheater, about 4000 feet above sea-level, with hills on three sides, and an extensive plain on the fourth. It is surrounded with a wall of sun-dried brick, with bastions, and entered by seven or eight gates. There are numerous mosques, bazaars, baths, and caravanserais. The citadel, originally a mosque, and 600 years old, was converted by Abbas Mirza into an arsenal. The blue mosque dates from the fifteenth century. Tabreez has manufactures of silks, cottons, carpets, leather and leather goods, etc. It is the great emporium for the trade of Persia on the west, and has an extensive commerce. It has frequently suffered from earthquakes. Pop. estimated about 200,000.

Tabular-spar (tab'ū-lar), or TABLE-SPAR (called also *Wollastonite*), in mineralogy, a silicate of lime, generally of a grayish-white color. It occurs either massive or crystallized, in rectangular four-sided tables, and usually in granite or granular limestone, occasionally in basalt or lava.

Tacahout (tak'a-hut), the small gall formed on the tamarisk-tree (*Tamarix indica*). It is of great value for the gallic acid obtained from it which is used as a mordant in dyeing and in tanning.

Tacamahac (tak'a-ma-hak), the name given to a bitter balsamic resin, the produce of several kinds of trees belonging to Mexico and the West Indies, the East Indies, South America, and North America. The balsam-poplar or tacamahac is one of these. See also *Calophyllum.*

Tachygraphy (ta-kig'ra-fi). See *Shorthand.*

Tachypetes (ta-kip'e-tēz). See *Frigate-bird.*

Tacitus (tas'i-tus), CAIUS CORNELIUS, an eminent Roman historian, born probably about 54 A.D. Of his education and early life we know little. He seems to have been first appointed to public office in the reign of Vespasian. Under Titus, by whom he was treated with distinguished favor, he became quæstor or ædile; was prætor under Domitian (A.D. 88), and consul under Nerva (A.D. 97). In 78 he married the daughter of Cneius Julius Agricola, the celebrated statesman and general, whose life he afterwards wrote. He was several years absent from Rome on provincial business, and probably then made the acquaintance of the German peoples. After his return to Rome he lived in the closest intimacy with the younger Pliny, and had a very extensive practice in the profession of law, acquiring a high reputation as an orator. The time of his death is uncertain; but it probably took place after A.D. 117. We have four historical works from his pen: his *Annals*, in sixteen books (of which books seventh to tenth inclusive are lost), which contain an account of the principal events in Roman history from the death of Augustus (A.D. 14) to that of Nero (A.D. 68); his *History* (of which only four books and a part of the fifth are extant), which begins with the year 69 A.D., when Galba wore the purple, and ends with the accession of Vespasian (70); his *Germany*, an account of the geography, manners, etc., of the country; and his *Life of Agricola.* The works of Tacitus have been pronounced, by the unanimous voice of his contemporaries and of posterity, to be masterpieces in their way. His style is exceedingly concise, so much so as to make it often difficult to gather his full meaning without great care. He had a wonderful insight into character, and could paint it with a master's hand. A high moral tone pervades all his writings, though he gives no clue to his religious belief.

Tack (tak), in navigation, the course of a ship in regard to the position of her sails and the angle at which the wind strikes them. Tacking is an operation by which a ship is enabled to beat up against a wind by a series of zigzags, the sails being turned obliquely to the wind first on one side and then on the other.

Tackamahack. See *Tacamahac.*

Tacna (täk'nä), a town of N. Chile, in a plain on a river of same name, connected by rail with Arica. It

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is of some commercial importance. Pop. 24,160.

Tacoma (tȧ-ko'mȧ), a city and port of Washington, on Commencement Bay, Puget Sound, 80 miles from the Pacific coast and 23 miles s. by w. of Seattle. Its situation is one of great beauty, commanding a magnificent view of Mount Rainier. It has an excellent harbor, with docks and wharves several miles in length, and has a large ocean traffic; also extensive shipyards. Lumber, shingles, and flour are very largely manufactured and there are many other industries. There are four steamship lines to the Orient and others to many parts of the world. Pop. 83,-743.

Taconic Mountains (tȧ-kon'ik), a range of mountains in the United States, connecting the Green Mountains of Western Massachusetts with the highlands of the Hudson. The 'Taconic System,' in geology, was named from the characteristic strata of this range, a metamorphic rock, believed to be older than the Silurian system.

Tactics (tak'tiks), the branch of military science which relates to the conduct of troops in battle. Naval tactics has the same significance in relation to the handling of ships and fleets. *Strategy*, on the other hand, refers to the movements leading up to a battle. See *Battle*.

Tacunga (ta-kun'ga), a town of Ecuador, capital of the province of Leon, at the foot of Cotopaxi. Pop. 15,000.

Tadema. See *Alma-Tadema*.

Tadmor. See *Palmyra*.

Tadpole (tad'pōl), the name given to the larval or young state of frogs and other amphibians.

Tael (tāl), a money of account in China worth about $1.50, the value of which varies considerably according to locality and the rate of exchange. The tael is also a definite weight, equal to 1.208 oz. troy.

Tænia. See *Tape-worm*.

Taepings. See *China*.

Taffeta (taf'e-ta), or TAFFETY, was originally the name applied to all kinds of plain silks, but has now become a kind of generic name for plain silk, gros de Naples, gros des Indes, shot silk, glacé, and others.

Taffrail, originally the upper flat part of a ship's stern, so called because frequently ornamented with carvings or pictures; now a transverse rail which constitutes the uppermost member of a ship's stern.

Taft, ALPHONSO, jurist, born in Townsend, Vermont, in 1810; was judge of the Cincinnati Superior Court, 1866-1872; appointed Secretary of War, March 8, 1876; and made attorney-general, May 22. He was United States minister to Austria in 1882-1884, and to Russia, in 1884-1885. He died May 21, 1891.

Taft, LORADO, American sculptor, born at Elmwood, Ill., in 1860. He was for a number of years an instructor in the Art Institute, Chicago. Among his works are *The Solitude of the Soul*, *The Blind*, *Fountain of the Great Lakes*. He is the author of *History of American Sculpture* (1903).

Taft, WILLIAM HOWARD, twenty-seventh President of the United States, was born at Cincinnati, Ohio, September 15, 1857; son of Alphonso Taft. Admitted to the bar in 1880, he became judge of the Superior Court of Ohio in 1887; United States Solicitor-General in 1890; and a judge of the United States Circuit Court in 1892. He held this position until 1900, being also dean and professor in the law department of the University of Cincinnati, 1896-1900. In the latter year he was made chairman of the Philippine Commission, and in 1901 civil governor of the Philippine Islands. In 1903 he was appointed Secretary of War in President Roosevelt's cabinet, in 1906 was sent to investigate the troubles in Cuba, of which he was for a time provisional governor, and in 1907 and 1909 made tours of inspection to Panama. He was elected president by the Republican party in 1908. His administration was distinguished by two special sessions of Congress, the passage of a new tariff bill, the prosecution of several corporations and movements in the line of conservation and reform. He was renominated in 1912; but was defeated, partly owing to the split in the Republican party. See *Progressive Party*.

Taganrog (tȧ-gȧn-rok'), a seaport of Russia, in the government of Ekaterinoslav, on the low cape on the northern shore of the Sea of Azof. It is built chiefly of wood, but the imperial palace where Alexander I died in 1825, and the Greek monastery are worthy of notice. Pop (1910) 68,360.

Taglioni (tȧl-yō'nē), MARIE, born in 1809, was known throughout Europe as the first ballet dancer of her time. She retired from the stage in 1847; but supported herself in London as

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TACOMA, WASHINGTON

A bird's-eye view of the city, showing Mt. Rainier, also called Mt. Tacoma, one of the loftiest peaks in the United States, containing many glaciers.

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a teacher of deportment. She died at Marseilles in 1884.

Tagore, RABINDRANATH, a Hindu poet, born in 1860, known in the Occident chiefly through his own translations of his poems, though in India he is widely honored as a teacher and man of affairs. Tagore's works best known in English are *Gitanjali* (devotional), *The Garden* and *The Crescent Moon.*

Tagus (tā'gus; Spanish, *Tajo;* Portuguese, *Tejo*), the largest river of Spain and Portugal, issues from the mountains of Albaracin, on the frontier of New Castile and Aragon, flows northwest and southwest, and enters the Atlantic. It has a total length of 540 miles, and is navigable for 115 miles.

Tahiti (tȧ-hē'ti), the largest of the Society Islands, consisting of two peninsulas, connected by an isthmus 3 miles broad, and submerged at high-water; area, 412 square miles. It is hilly, volcanic, beautiful, and highly fertile; and produces sugar, cocoanut, arrow-root, dye-woods, etc. Pop. 10,639. See *Society Islands.*

Tailor-bird (*Orthotŏmus longicaudus*), a bird so named from its curious habits of weaving or sewing together leaves in order to form a nest. It belongs to the sub-family of the Sylvinæ or true warblers, and inhabits India and the Eastern Archipelago.

Taimyr (tī'mĕr), a peninsula of Northern Siberia, extending into the Arctic Ocean, between the mouth of the Yenisei and Khatang Gulf, and containing Cape Chelyuskin, the most northerly land in Asia.

Taine (tān), HIPPOLYTE ADOLPHE, a French writer, born at Vouziers (Ardennes) in 1828, and educated at the Collège Bourbon and the École Normale. In 1854 his first work, an *Essay on Livy*, was crowned by the Academy; in 1864 he was appointed professor in the School of Fine Arts in Paris; and in 1878 he was elected to a seat in the Academy. His *History of English Literature*, one of the best and most philosophical works on the subject, appeared in 1864 (four vols.); his *Philosophy of Art* in 1865; his *Notes on England* in 1872; and his *Origin of Contemporary France* in 1875-84, the last a work of great research and value, in two sections, the first dealing with *L'ancien Régime*, the second with the *Revolution.* He died March 5, 1893.

Tainter (tān'ter), CHARLES SUMNER, inventor, born at Watertown, Massachusetts, in 1854. He was the inventor of the graphophone, and aided in inventing the radiophone, an instrument for transmitting sounds to a distance through the agency of light. He took part in the 1874 expedition to the South Pacific to observe the transit of Venus. Was decorated by the French Academy in 1899.

Taiping, or TAEPING (tī-ping'). See *China.*

Tait (tāt), ARCHIBALD CAMPBELL, archbishop of Canterbury, son of Crauford Tait, writer to the signet, was born at Edinburgh in 1811; died in 1882. He was educated at Oxford, and there opposed the Tractarian principles. He was appointed headmaster of Rugby on the death of Dr. Arnold in 1842; dean of Carlisle in 1850; bishop of London in 1856; and archbishop of Canterbury in 1868. His primacy was marked by the disestablishment of the Irish Church, and by the passing of the Public Worship Regulation Act of 1874.

Tait, PETER GUTHRIE, physicist and mathematician, born at Dalkeith, Scotland, in 1831; was educated at Edinburgh and Peterhouse, Cambridge. In 1854 he was appointed professor of mathematics at Queen's College, Belfast, and in 1860 professor of natural philosophy at Edinburgh. He was the joint-author, with Professor Sir William Thomson, of a textbook on *Natural Philosophy*, and with the late Professor Balfour Stewart of *The Unseen Universe.* His *Heat* appeared in 1884, *Light* in 1884, *Properties of Matter* in 1885, and *Dynamics* in 1895. For his various mathematical and physical researches the Royal Society, London, awarded him a royal medal in 1886. He died July 4, 1901.

Taiwan (tī-wän'), the capital of the Chinese island Formosa, one of the treaty ports, with considerable trade in sugar and opium. Pop., including Takow, which almost forms one city with it, 235,000. See *Formosa.*

Táj-Mahal (tâzh-ma-hâl'). See *Agra.*

Tajurah (tȧ-jō'rȧ), a seaport town on the African coast of the Gulf of Aden, on a bay of the same name. It is the outlet of trade from Shoa, and was ceded to France in 1887. Pop. about 2000.

Takow. See *Taiwan.*

Talavera de la Reina (tȧ-lȧ-vā'rȧ dā lā rā'ē-nȧ), a town of Spain, in the province of Toledo, on the Tagus, 64 miles southeast of Madrid. It has a picturesque appearance, and various interesting buildings. A great battle was fought here July 27 and 28, 1809, between the French under Victor, Jourdan, and King Joseph,

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and the British under Wellington, in which the former were defeated. Pop. 10,580.

Talbot (tal'but), a kind of hound formerly in vogue, pure white in color, probably the original of the bloodhound.

Talbotype. See *Photography.*

Talc (talk), a magnesian mineral, consisting of broad, flat, smooth laminæ or plates, unctuous to the touch, of a shining luster, translucent, and often transparent when in very thin plates. There are three principal varieties of talc, *common*, *earthy*, and *indurated*. Talc is a silicate of magnesium, with small quantities of potash, alumina, oxide of iron, and water. It is used in many parts of India and China as a substitute for window-glass. A variety of talc called French chalk (or steatite) is used for tracing lines on wood, cloth, etc., instead of chalk. See *Potstone*, *Soapstone*, *Steatite.*

Talca (täl'kä), a town of Chile, capital of the province of Talca, on the Claro, is connected by rail with Santiago, and has manufactures of ponchos. Pop. 42,766. The province has an area of 3664 sq. miles, and pop. 146,685.

Talcahuana (täl-kä-wä'nō), a seaport of Chile, province Concepcion, with an arsenal, shipyards, etc. Pop. 13,499.

Talent (tal'ent), the name of a weight and denomination of money among the ancient Greeks, and also applied by Greek writers to various standard weights and denominations of money of different nations; the weight and value differing in the various nations and at various times. The Attic talent as a weight contained 60 Attic minæ or 6000 Attic drachmæ, equal to 56 lbs. 11 oz. troy weight. As a denomination of silver money it was equal to $1218.75. The great talent of the Romans is computed to be equal to $496.66 and the little talent to $375. A Hebrew weight and denomination of money, equivalent to 3000 shekels, also receives this name. As a weight it was equal to about 93⅞ lbs. avoir.; as a denomination of silver it has been variously estimated at from $1700 to $1980.

Talfourd (tal'furd), Sir Thomas Noon, an English dramatist and poet, was born in 1795, and was brought up at Reading, where his father was a brewer. He was called to the bar in 1821, and in 1833 was made serjeant-at-law. In 1835 he was returned to parliament for Reading, and in 1836 his tragedy of *Ion* (published the previous year) was produced at Covent Garden, and achieved distinguished success. The tragedies subsequently produced by him were *The Athenian Captive; Glencoe, or the Fate of the Macdonalds;* and *The Castilian*, an historical tragedy. Besides his dramas he was the author of a *Life of Charles Lamb* and of *Vacation Rambles.* In 1849 he was raised to the bench in the Court of Common Pleas, and received at the same time the honor of knighthood. He died suddenly in 1854 at Stafford, while delivering his charge to a grand-jury.

Taliacotian Operation (tal-i-a-kosh'yun). See *Rhinoplastic Operation.*

Taliessin (tal'i-sin), a Welsh bard said to have flourished during the twelfth or thirteenth century, and styled *Pen Beirdd*, 'chief of the bards.'

Talipot Palm (tal'i-pot; *Corỳpha umbraculifĕra*), the great fan-palm, a native of Ceylon. The cylindrical trunk reaches a height of 60, 70, or 100 feet, and is covered with a tuft of fan-like leaves, usually about 18 feet in length and 14 in breadth. The leaves

Talipot Palm (*Corỳpha umbraculifĕra*).

are used for covering houses, for making umbrellas and fans, and as a substitute for paper. When the tree has attained its full growth, the flower spike bursts from its envelope or spathe with a loud report. The flower spike is then as white as ivory, and occasionally 30 feet long. When its fruit is matured, the tree generally dies.

Talisman (tal'is-man), a figure cast or cut in metal or stone,

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and made, with certain superstitious ceremonies, at some particular moment of time, as when a certain star is at its culminating point, or when certain planets are in conjunction. The talisman thus prepared is supposed to exercise extraordinary influences over the bearer, particularly in averting disease. In a more extensive sense the word is used, like amulet, to denote any object of nature or art, the presence of which checks the power of spirits or demons, and defends the wearer from their malice. Relics, consecrated candles, rosaries, images of saints, etc., were employed as talismans in the middle ages: and at that time the knowledge of the virtues of talismans and amulets formed an important part of medical science.

Talitrus (tăl'i-trus). See *Sandhopper.*

Tallage (tal'ij), a sort of tax formerly levied by the English kings on towns and counties, as part of the revenues of the crown, being originally exacted probably in lieu of military service. It was abolished by statute of 1340.

Tallahassee (tal-à-has'sē), a city, capital of the State of Florida and of Leon Co., 165 miles W. of Jacksonville, and 26 miles N. of the Gulf of Mexico, being connected by rail with the seaport of St. Marks. It has cotton and cigar-making industries, and has the Florida State College, the Florida Normal and Industrial School (colored), and several libraries. Pop. 5018.

Tallard (tăl-lär), Camille de la Baume, Duc de Hostun, Comte de, Marshal of France, descended of an ancient family of Dauphiny, was born in 1652; died in 1728. He entered the army while young, and after serving under the Great Condé in Holland, was engaged under Turenne in Alsace in the brilliant campaigns of 1674 and 1675. He distinguished himself subsequently on various occasions, and in 1693 was made lieutenant-general; marshal in 1703. In 1704 he was taken prisoner at the battle of Blenheim, and was carried to England, where he remained seven years.

Talladega (tal-là-dē'gà), a city, capital of Talladega Co., Alabama, 109 miles N. N. E. of Selma. It contains a State institution for the deaf, dumb and blind, and has large manufactures of cotton, fertilizers, etc. Pop. 5854.

Tallegalla (tal-e-gal'la), or Brush Turkey, a remarkable genus of rasorial birds, belonging to the family of Megapodidæ, or mound-birds. (See *Megapodius.*) The *Tallegalla Lathami* is the best-known species, and that usually designated by the distinctive name of 'brush turkey.' It inhabits Australia, where it is also known by the names 'wattled tallegalla' and 'New Holland vulture'—the latter name having reference to the naked vulturine head and neck. The male when full grown is colored of a blackish-brown above and below, with grayish tints on the back. The head and neck are covered with very small feathers of blackish hue, whilst a large wattle, colored bright or orange yellow, depends from the front of the neck. These birds are remarkable on account of the huge, conical 'egg-mound' which they form, several of them jointly, for the purpose of therein depositing their eggs, which are hatched by the heat of the decomposing mass of vegetable matter piled up. The eggs are greatly sought after on account of their delicious flavor.

Talleyrand-Périgord (tăl-ā-rān-pā-rē-gōr), Charles Maurice de, Prince of Benevento, a famous French diplomatist, was born at Paris in 1754; died there in 1838. Though the eldest of three brothers he was, in consequence of lameness caused by an accident, deprived of his rights of primogeniture, and devoted, against his will, to the priesthood. His high birth and great ability procured him rapid advancement, and in 1788 he was consecrated bishop of Autun. On the meeting of the states-general he was elected deputy for Autun. He sided with the popular leaders in the revolutionary movements; and his advocacy of the abolition of tithes and the transference of church lands to the state gained him great popularity. In 1790 he was elected president

Talleyrand.

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of the national assembly. When the civil constitution of the clergy was adopted he gave his adhesion to it, and ordained the first clergy on the new footing. For this he was excommunicated by a papal brief, and thereupon embraced the opportunity to renounce his episcopal functions (1791). In 1792 he was sent to London charged with diplomatic functions, and during his stay there was proscribed for alleged royalist intrigues. Forced to leave England by the provisions of the Alien Act, in 1794 he sailed for the United States, but returned to France in 1796. The following year he was appointed minister of foreign affairs; but being suspected of keeping up an understanding with the agents of Louis XVIII, he was obliged to resign in July, 1799. He now devoted himself entirely to Bonaparte, whom he had early recognised as the master spirit of the time, and after Bonaparte's return from Egypt contributed greatly to the events of the 18th Brumaire (November 10, 1799), when the directory fell and the consulate began. He was then reappointed minister of foreign affairs, and for the next few years was the executant of all Bonaparte's diplomatic schemes. After the establishment of the empire in 1804 he was appointed to the office of grand-chamberlain, and in 1806 was created Prince of Benevento. After the Peace of Tilsit in 1807 a coolness took place between him and Napoleon, and became more and more marked. In 1808 he secretly joined a royalist committee. In 1814 he procured Napoleon's abdication, and afterwards exerted himself very effectually in reëstablishing Louis XVIII on the throne of his ancestors. He took part in the Congress of Vienna, and in 1815, when the allies again entered Paris, he became president of the council with the portfolio of foreign affairs; but as he objected to sign the second Peace of Paris he gave in his resignation. After this he retired into private life, in which he remained for fifteen years. When the revolution of July, 1830, broke out, he advised Louis Philippe to place himself at its head and to accept the throne. Declining the office of minister of foreign affairs, he proceeded to London as ambassador, and crowned his career by the formation of the Quadruple Alliance. He resigned in November, 1834, and quitted public life forever. His *Memoirs* were published in 1891.

Tallien (tàl-i-aṇ), JEAN LAMBERT, a French revolutionist, was born at Paris in 1769, and first made himself known by publishing a revolutionary journal called *Ami du Citoyen*. He soon became one of the most popular men of the revolutionary party, and took part in most of the sanguinary proceedings which occurred during the ascendency of Robespierre. After the fall of Danton and his party, he perceived that he should become one of the next victims of Robespierre if he did not strike the first blow, and it was mainly by his influence that the latter with his friends was brought to the guillotine. He subsequently became a member of the Council of Five Hundred, but his influence gradually declined. In after years he was glad to accept the office of French consul at Alicante. He died at Paris, in poverty and obscurity, in 1820.

Tallis (tal'is), THOMAS, author of some of the finest music in the cathedral service of the English Church, was born about 1515, and served in the chapel royal during the reigns of Henry VIII, Edward VI, Mary, and Elizabeth. He died in 1585, and was buried in the parish church at Greenwich.

Tallow (tal'ō), the harder and less fusible fat of animals, especially cattle and sheep, melted and separated from the fibrous matter mixed with them. Tallow is firm, brittle, and has a peculiar heavy odor. When pure it is white and nearly insipid; but the tallow of commerce has usually a yellowish tinge, which may be removed by exposure to light and air. Tallow is manufactured into candles and soap, and is extensively used in the dressing of leather, and in various processes of the arts. *Vegetable tallow* is contained in the seeds of various plants, one of the best known of which is the candle-berry (which see). See also *China Wax*, and next article.

Tallow-tree (*Stillingia sebifera*), a tree of the nat. order Euphorbiaceæ, one of the largest, the most beautiful, and the most widely diffused of the plants found in China. From a remote period it has furnished the Chinese with the material out of which they make candles. The capsules and seeds are crushed together and boiled; the fatty matter is skimmed as it rises, and condenses on cooling. The tallow-tree has been introduced into the United States, and is almost naturalized in the maritime parts of Carolina. It has also been acclimatized by the French in Algeria. The tallow-tree of Malabar is *Vateria indica*.

Tally (tal'i), a piece of wood on which notches or scores are cut, as the marks of number. In purchasing and selling it was once customary for traders to have two sticks, or one stick cleft into two parts, and to mark with scores or

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notches on each the number or quantity of goods delivered, or what was due between debtor and creditor, the seller or creditor keeping one stick, and the purchaser or debtor the other. Before the use of writing, or before writing became general, this or something like it was the usual method of keeping accounts. In the exchequer of England tallies were used till late in the eighteenth century. An exchequer tally was an account of a sum of money lent to the government, or of a sum for which the government would be responsible. The tally itself consisted of a squared rod of hazel or other wood, having on one side notches, indicating the sum for which the tally was an acknowledgment. On two other sides opposite to each other, the amount of the sum, the name of the payer, and the date of the transaction, were written by an official called the writer of the tallies. This being done the rod was then cleft longitudinally in such a manner that each piece retained one of the written sides, and one half of every notch cut in the tally. One of these parts, the *counterstock*, was kept in the exchequer, and the other, the *stock*, only issued. When the part issued was returned to the exchequer (usually in payment of taxes) the two parts were compared, as a check against fraudulent imitation. This ancient system was abolished by 25 Geo. III lxxxii. The size of the notches made on the tallies varied with the amount. The notch for £100 was the breadth of a thumb, for £1 the breadth of a barleycorn. A penny was indicated by a slight slit.

Tally System, a mode of selling upon credit, in which the purchaser agrees to pay for the purchase by fixed installments at a certain rate, and both seller and purchaser keep books in which the circumstances of the transaction and the payment of the several installments are entered, and which serve as a tally and counter-tally. This mode of doing business has lately increased enormously in all branches of trade.

Talma (tâl-mâ), François Joseph, a celebrated French tragedian, was the son of a Parisian dentist, and was born at Paris in 1763. In 1787 he made his début at the Comédie Française in the character of *Séide* in Voltaire's *Mahomet*. His greatest successes were achieved at the Théâtre Français (afterwards Théâtre de la Republique), which he and others founded in 1791. He enjoyed the intimacy of Napoleon, and was the friend of Chénier, Danton, Camille Desmoulins, and other revolutionists. He died in 1826. Talma was the greatest modern tragic actor of France, and one of the earliest advocates of realism in scenery and costume.

Talmage (tal'maj), Thomas De Witt, clergyman, born at Boundbrook, New Jersey, in 1832. After holding several Dutch Reformed pastorates, he became pastor of the Central Presbyterian Church in Brooklyn in 1869, and of the First Presbyterian Church in Washington in 1896. He won great popularity as a pulpit orator and lecturer, and his sermons were printed weekly for over thirty years in a large number of newspapers. For years he was editor of the *Christian Herald*, and published a number of works on religious subjects. He died April 12, 1902.

Talmud (tal'mud), a Chaldaic word signifying 'doctrine,' and sometimes used to designate the whole teaching of the Jewish law, comprising all the writings included in what we call the Old Testament, as well as the oral law or *Mishna*, with its supplement or commentary the *Gemara*, but more frequently applied only to the *Mishna* and *Gemara*. The main body of the Talmud — in the second of these two senses — consists of minute directions as to conduct. Its contents are hence very miscellaneous, and they are as varied in their character as in their subject. Much of it is taken up with regulations of the most puerile nature, and not a little with details only fitted to excite disgust. In other parts again there are passages containing the loftiest expression of religious feeling, passages which are said to be the source of almost all that is sublime in the liturgy of the Church of Rome, and those liturgies which have been mainly derived from it. Interspersed throughout the whole are numerous tales and fables, introduced for the sake of illustration. The Jews are carefully instructed in it, and its very language is sometimes quoted and acknowledged in the New Testament. The injunctions referred to in the sermon on the mount as having been 'said by them of old time' (properly, the elders) are all from the Mishna. The Gemara was originally an oral commentary of the Mishná, as the Mishna itself was originally an oral commentary of the Mikra, or written law. It consisted of the explanations and illustrations which the teachers of the Mishna were in the habit of giving in the course of their lessons. These oral comments were handed down from age to age, differing of course in different localities, and gradually increasing in quantity; and they were at last committed

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to writing in two forms, the one called the Jerusalem and the other the Babylonian Gemara, or, with the addition of the Mishna, which is common to both, the Jerusalem and the Babylonian Talmud. The Jerusalem Talmud is the earlier and by much the smaller of the two. The language of both the Gemaras is a mixed Hebrew, but that of the Babylonian Gemara is much less pure than the other; in the narrative portions, designed as popular illustrations of the other parts, it comes near the Aramaic or vernacular dialect of the Eastern Jews. The style is in both cases extremely condensed and difficult. The Mishna, with its corresponding Gemara, is divided into six orders or principal divisions. The subjects of these orders are agriculture, festivals, women, damages, holy things, and purifications. These orders are subdivided into sixty-three tracts, to which the Babylonian Gemara adds five others, thus containing sixty-eight tracts in all. Other divisions of the Talmud are the Halaka, the doctrinal and logical portion; Hagada, the rhetorical or imaginative portion; and Cabala, the mystical portion, including theosophy and magic. Many translations of parts of the Talmud have appeared.

Talpa (tal'pȧ). See *Mole.*

Talus (tā'lus), in geology, a sloping heap of broken rocks and stones at the foot of any precipice, cliff, or rocky declivity.

Tamandua (ta-man'dū-a), a species of ant-eater.

Tamaqua (tȧ-mą'kwȧ), a town of Schuylkill Co., Pennsylvania, 17 miles N. E. of Pottsville, and in an extensive coal-mining district. There are many collieries, iron foundries, and machine shops, and manufactures of explosives and hosiery. Pop. 9462.

Tamaricaceæ (tam-ar-i-kā'se-ē), a small nat. order of polypetalous exogens. The species are either shrubs or herbs, inhabiting chiefly the basin of the Mediterranean. They have minute alternate simple leaves and usually small white or pink flowers in terminal spikes. They are all more or less astringent, and their ashes after burning are remarkable for possessing a large quantity of sulphate of soda. See *Tamarisk.*

Tamarin (tam'a-rin), the name of certain South American monkeys. The tamarins are active, restless, and irritable little creatures, two of the smallest being the silky tamarin (*Midas rosalia*) and the little lion monkey (*M. leonina*), the latter of which, though only a few inches in length, presents a wonderful resemblance to the lion.

Tamarind (tam'a-rind; *Tamarindus indica*), a large and beautiful tree of the East and West Indies, nat. order Leguminosæ. It is cultivated, chiefly for the sake of its pods (tamarinds). The West Indian tamarinds are put into casks, with layers of sugar between them, or with boiling syrup poured over them, and are called prepared tamarinds. The East Indian tamarinds, which are most esteemed, are preserved without sugar. They are dried in the sun, or artificially with salt added.

Tamarind (*Tamarindus indica*).

Tamarisk (tam'a-risk), the common name of shrubs of the genus *Tamarix*, the type of the natural order Tamaricaceæ. *T. gallica* is very abundant all round the Mediterranean, and is naturalized on some parts of the south coast of England. It attains a height of from 16 to 20 feet, has small flowers of a bright rose color, and altogether has a very attractive appearance, which makes it very much sought after as an ornament for shrubberies and parks.

Tamatave (tăm-ȧ-tăv'), the chief port on the eastern side of Madagascar. It was for a time capital of the island. Pop. about 6000.

Tamaulipas (tȧ-mä-ų-lē'pȧs), a state of Mexico, on the Gulf of Mexico, north of Vera Cruz; area, 32,270 square miles. The coast is low, but in the interior, towards the south, the surface becomes finely diversified by mountain, hill, and valley. The soil is generally fertile. Cattle in vast numbers are reared on the pastures. The foreign trade is carried on chiefly at the ports of Tampico and Matamoros. The capital is Ciudad Victoria. Pop. 218,948.

Tambookieland. See *Tembuland.*

Tambourine (tam-bų-rēn'), a musical instrument of the drum species, much used among the Spanish and Italian peasants, as well as else-

Tambourine.

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where. It consists of a piece of parchment stretched over the top of a broad hoop, which is furnished with little bells. It is sounded by sliding the fingers along the parchment or by striking it with the back of the hand or with the fist or the elbow.

Tambour-work (tam-bör'; French *tambour*, a drum), a species of embroidery on muslin or other thin material, worked on circular frames which resemble drum-heads. The practice of tambouring is rapidly dying out, being replaced by pattern-weaving, by which tambour-work can be closely imitated.

Tambov (tâm-bof'), a government of Russia, south of Nijni-Novgorod and Vladimir, between the basins of the Oka and the Don; area, 25,676 sq. miles. It is one of the largest, most fertile, and most densely peopled provinces of Central Russia. More than two-thirds of the surface is arable. The principal crops are corn and hemp. Vast numbers of excellent horses, cattle, and sheep are reared. The chief industrial establishments are distilleries, tallow-melting works, sugar works, and woolen mills. Pop. 3,205,200.— TAMBOV, the capital, 263 miles southeast of Moscow, is built mostly of wood. It has a great trade in corn and cattle, and soap and tallow are largely made. Pop. 60,729.

Tamerlane (tam-er-lān). See *Timur*.

Tamias (tam'i-as). See *Squirrel*.

Tamil (tam'il), the name of a race which inhabits South India and Ceylon. The Tamils belong to the Dravidian stock of the inhabitants of India, and are therefore to be regarded as among the original inhabitants who occupied the country before the Aryan invasion from the north, but they adopted the higher civilization of the Aryans. The Tamil language is spoken not only in South India and Ceylon, but also by a majority of the Indian settlers in places farther east, as Pegu and Penang. There is an extensive literature, the greater part of it in verse. Among the chief works are the *Kural* of Tiruvalluvar, an ethical poem, and the Tamil adaptation of the Sanskrit *Ramayana*.

Tamise (tâ-mēz), a manufacturing town of Belgium, province of E. Flanders, on the Scheldt. Pop. 12,463.

Tam o'Shanter, the hero of Burns's poem of the same name; also a cap with a close-fitting rim and large, flat top, usually with a knob or tassel in the center; in Scotland, a tight-fitting woolen cap or a braid bonnet.

Tammany (tam'a-ni), SOCIETY OF, or Columbian Order, formed in New York city in 1789, as a counterweight to the so-called 'aristocratic' Society of the Cincinnati; deriving its name from a noted friendly Delaware chief named Tammany, who had been canonized by the soldiers of the Revolution as the patron saint of America. The grand sachem and 13 sachems were intended to typify the President and the governors of the 13 original states. It was organized for social and benevolent purposes, but always had a political character. Always essentially Democratic, it represented the distrust of Hamilton's aristocratic policy. It is the leading political mainspring of New York politics.

Tammy, TAMIS, TAMINE, or TAMINY, a kind of woolen cloth highly glazed, used for making fine sieves employed in cooking, which are also called tammies. It is also used under the names of lasting and durant for ladies' boots.

Tampa (tam'pâ), a port of Florida, Hillsboro Co., on the Gulf Coast; a rising business center, the terminus of three railways, and the point of departure of steamers for various ports. Among its places of interest are De Soto Park and the Convent of Holy Names. Here are large cigar factories and lumber mills and it is an important shipping point for naval stores, fruits, fish, and cattle. It has become a favorite winter resort. Pop. 37,782; including suburbs, 52,500.

Tampico (tâm-pē'kō), a seaport town of Mexico, in the state of Tamaulipas, in the extreme south, 5 miles from the mouth of the Panuco. On account of a bar the harbor is not accessible for large vessels; nevertheless, the trade is considerable. Strong fibers used in place of bristles for brushes, are exported from there. Pop. 17,569.

Tamsui (tăm-sō'ē), a town of China, island of Formosa, one of the treaty ports, with a trade in tea. Pop. about 100,000.

Tam-tam, or TOM-TOM, a cylindrical drum used in the East Indies. It is beaten upon with the fingers, or with the open hand. Public notices, when proclaimed in the bazaars of Eastern towns, are generally accompanied by the tam-tam.

Tana (tä'nä), (1) a river in the extreme north of Norway, forming part of the boundary between it and Russia. (2) A river of E. Africa, within the British 'sphere of influence,' rising in Mount Kenia, navigable for about 100 miles in the rainy season.

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Tanagers (tan'a-jerz), passerine birds, genus *Tanagra*, family Fringillidæ, or finches, distinguished by the bill being of triangular shape at its base and arched towards its tip, and remarkable for their bright colors. They are chiefly found in the tropical parts of America.

Tanagra Figurines, a class of antique terra-cotta statuettes and reliefs, first found in 1893 in the necropolis of Tanagra, Greece, but since found elsewhere in Greece. They date from about 400 B.C., though some of them are prehistoric.

Tanais. See *Don.*

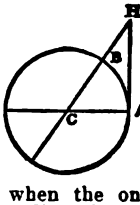
Tananarivo. See *Antananarivo.*

Tancred (tan'kred), son of the Marquis Odo the Good and Emma, the sister of Robert Guiscard, born in 1078, was one of the most famous heroes of the first Crusade. He distinguished himself at the siege of Nicæa (1097), at the battle of Dorylæum (July, 1097), at the capture of Jerusalem (July, 1099), and at Ascalon (August 12), and was appointed by Godfrey de Bouillon Prince of Galilee. He died in 1112, in his thirty-fifth year, of a wound received at Antioch. He is represented by Tasso in the *Jerusalem Delivered* as the flower and pattern of chivalry.

Taney (tą'ne), ROGER BROOKE, jurist, born in Calvert Co., Maryland, in 1777. He was graduated from Dickinson College, was admitted to the bar in 1799, and elected to the Maryland Senate in 1816. In 1831 he became Attorney-General of the United States, and in 1836 was appointed to succeed John Marshall as Chief Justice of the United States Supreme Court, a position which he held until his death in 1864. The most famous of his decisions is that in the Dred Scott case, denying freedom to a slave going into a free State, an incident used effectively in the antislavery movement.

Tanganyika (tän-gän-yē'kä), a lake of Central Africa, lying to the south of Lake Albert Nyanza. It extends from about 3° 25′ to 8° 40′ S. lat., and from 29° 20′ to 32° 20′ E. lon. It is 420 miles long, has an average breadth of about 30 miles, and is 2700 feet above the level of the sea. The basin in which it lies is inclosed by an almost continuous series of hills and mountains. It is fed by numerous rivers and streamlets, and discharges by the river Lukuga into the Congo. There are several London Missionary Society stations on Tanganyika, and on the eastern shore is the Arab town of Ujiji. A carriage-road, 210 miles, runs to Nyassa. Tanganyika was discovered by Speke and Burton in 1858.

Tangent (tan'jent), in geometry, a straight line which touches or meets a circle or curve in one point, and which being produced does not cut it; a straight line drawn at right angles to the diameter of a circle, from the extremity of it, as H A in figure, which being continued at A, would merely touch and not cut the circle. In trigonometry the tangent of an arc is a straight line touching the circle of which the arc is a part, at one extremity of the arc, and meeting the diameter passing through the other extremity. Thus A H is the tangent of the arc A B, and it is also said to be the tangent of the angle A C B, of which A B is the measure. The arc and its tangent have always a certain relation to each other; and when the one is given in parts of the radius, the other can always be computed. For trigonometrical purposes tangents for every arc from 0 degrees to 90 degrees, as well as sines, cosines, etc., have been calculated with reference to a radius of a certain length, and these or their logarithms formed into tables. In the higher geometry the word tangent is not limited to straight lines, but is also applied to curves in contact with other curves, and also to surfaces.



Tanghin (tang'gin; *Tanghinia venenifera*), a tree of Madagascar, nat. order Apocynaceæ, bearing a fruit the kernel of which, about the size of an almond, is highly poisonous. Trial by tanghin was formerly used in Madagascar as a test of the guilt or innocence of a suspected criminal. The person undergoing the ordeal was required to swallow a small portion of the kernel. If his stomach rejected it he was deemed innocent, but if he died, as happened in most cases, he was deemed to have deserved his fate and suffered the punishment of his crime.

Tangier (tan'jēr), a seaport of Morocco, on the Strait of Gibraltar. It stands on two heights near a spacious bay, and presents a very striking appearance from the sea, rising in the form of an amphitheater, and defended by walls and a castle. Tangier is almost destitute of manufactures. The harbor is a mere roadstead, but there is a large trade. In 1662 Tangier was annexed to the English crown as part of the dowry of the Infanta of Portugal, the wife of King Charles II, but in 1684 it was

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MONSTER BRITISH TANK POISED ON THE EDGE OF A GERMAN TRENCH

One of the latest and largest tanks plunging forward on its irresistible way to carry terror and destruction to the Hun. It was the work of tanks like this that contributed largely to the British victory at Cambrai.

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trated a very large army for the reconquest of East Prussia.

General Samsonoff, who had been in command of the southern army, pressed on through Allenstein, with intent to reach the Vistula. To succeed in this it was necessary to pass through a belt of difficult country, abounding in lakes, marshes, and woods around Osterode, Tannenberg, and Eylau.

It was here that Hindenburg with his intimate knowledge of the swampy land gave battle to the Russians. The Battle of Tannenberg lasted three days, and a quarter of a million men were in action on each side. On the 30th of August the Russian flank was turned, and the enveloping movement was carried on during the night. On the 31st the collapse of the line began. As the Russians gave way under the converging pressure of front and flank attacks they found that it was a difficult matter to extricate themselves from the wilderness of woods, lakes and marshes in which they had given battle. Three Russian generals fell in the final struggle: Samsonoff, Postitsch, and Martos. The Germans claimed that of the five army corps which formed the enemy's main battle line they destroyed three and a half. It was the most complete victory won by the Germans in the opening phase of the war and resulted in a precipitate evacuation of East Prussia by the invaders. Rennenkampf fought a heroic rearguard action, falling back by way of Gumbinnen, recrossing the frontier and retreating to the Niemen, where large reinforcements awaited.

Tanner, HENRY OSSAWA (1859-), an American painter, son of Benjamin Tucker Tanner, bishop of the African Methodist Episcopal Church. He was born at Pittsburgh, Pa., and began his studies at the Pennsylvania Academy of Fine Arts under Thomas Eakins; later a pupil of Jean Paul Laurens and Benjamin Constant of Paris. He specialized in religious subjects. He is represented in the Luxembourg ('Raising of Lazarus'), the Wilstach Collection, Philadelphia ('Annunciation'), Carnegie Institute ('Christ at the Home of Mary and Martha'), and the Chicago Art Institute ('The Two Disciples at the Tomb'). He is an Associate of the National Academy.

Tanner's Sumach. See *Coriaria.*

Tannhäuser (tân'hoi-zĕr), or TANHÄUSER, in old German legend, a knight who gains admission into a hill called the Venusberg, in the interior of which Venus holds her court, and who for a long time remains buried in sensual pleasures, but at last listens to the voice of the Virgin Mary, whom he hears calling upon him to return. The goddess allows him to depart, when he hastens to Rome to seek from the pope (Pope Urban) absolution for his sins. The pope, however, when he knows the extent of the knight's guilt, declares to him that it is as impossible for him to obtain pardon as it is for the wand which he holds in his hand to bud and bring forth green leaves. Despairing, the knight retires from the presence of the pontiff, and enters the Venusberg once more. Meanwhile the pope's wand actually begins to sprout, and the pope, taking this as a sign from God that there was still an opportunity of salvation for the knight, hastily sends messengers into all lands to seek for him. But Tannhäuser is never again seen. The Tannhäuser legend has been treated poetically by Tieck, and Richard Wagner has adopted it (with modifications) as the subject of one of his operas.

Tannic Acid (tan'ik), or TANNIN, a peculiar acid which exists in every part of all species of oaks, especially in the bark, but is found in greatest quantity in gall-nuts. Tannic acid, when pure, is nearly white, and not at all crystalline. It is very soluble in water, and has a most astringent taste, without bitterness. It derives its name from its property of combining with the skins of animals and converting them into leather, or tanning them. It is the active principle in almost all astringent vegetables, and is used in medicine in preference to mineral astringents, because free from irritant and poisonous action. The name is generally applied to a mixture of several substances.

Tanning (tan'ing), the operation of converting the raw hides and skins of animals into leather by effecting a chemical combination between the gelatine of which they principally consist and the astringent vegetable principle called tannic acid or tannin. The object of the tanning process is to produce such a chemical change in skins as may render them unalterable by those agents which tend to decompose them in their natural state, and in connection with the subsequent operations of currying or dressing to bring them into a state of pliability and impermeability to water which may adapt them for the many useful purposes to which leather is applied. The larger and heavier skins subjected to the tanning process, as those of buffaloes, bulls, oxen, and cows, are technically called *hides;* while those of smaller animals, as calves, sheep, and goats, are called *skins.* In preparing the hides and skins for tanning

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they are subjected to certain operations already described under *Leather*, after which the tanning proper begins. The various substances used for tanning are oak, fir, mimosa, and hemlock bark, sumach, myrobalans, divi-divi, valonia-nuts, cutch, kino, gambir, and oak-galls — all of which contain tannin. The impregnation of the hides with this tannin may be effected either by placing them between layers of bark (oak bark being the best) in a vat filled with water, or steeping them in a liquor containing a small at first, but steadily increasing proportion of tannin throughout a series of pits. This liquor usually consists of water in which the ground or crushed tanning material has been steeped. The raw hide takes about a year to prepare it for the best quality of leather. There is also a process called *tawing*, which is employed chiefly in the preparation of the skins of sheep, lambs, goats, and kids. In this process the skins are steeped in a bath of alum, salt, and other substances, and they are also sometimes soaked in fish-oil. The more delicate leathers are treated in this manner, those especially which are used for wash-leathers, kid gloves, etc. After the leather is tanned it is finished for use by the process of *currying* (which see). Various improvements have been attempted to be made in the art of tanning, such as the preparation of the skins by means of metallic solutions instead of by vegetable tan-liquor; the forced absorption of the tan by applying pressure between cylinders; and the preparation of the skins by a chemical agent, so as to induce a quicker absorption of the tan. It has been found, however, that the slow process followed by the old tanners produces leather far superior to that produced by the new and more rapid methods, though a fair leather for certain purposes may be produced in five to ten weeks.

Tanrec (tan'rek), or TENREC (*Centētes*), a genus of insectivorous mammals, resembling in outward appearance the European hedgehog, they being covered with bristles about an inch in length. These animals inhabit Madagascar. They hibernate like the European hedgehog, and live in burrows, which they excavate by means of their strong claws.

Tansy (tan'zi; *Tanacētum vulgāre*), is a well-known plant, being abundant throughout Europe and naturalized in the United States. It is a tall plant, with divided leaves and button-like heads of yellow flowers. Every part of the plant is bitter, and it is considered as tonic and anthelmintic, tansy-tea being an old popular medicine. It is now cultivated in gardens mainly for the young leaves, which are shredded down and employed to flavor puddings, cakes, etc.

Tanta (tăn'tă), a town of Lower Egypt, situated on the railway about 50 miles N. of Cairo. It has many large public buildings, besides a palace of the Khedive, and is celebrated in connection with the great Moslem saint Seyyid-el-Bedawi, to whom a mosque is here erected. Tanta has three great annual fairs, which are held in January, April, and August, and at the latter 500,000 persons are said to congregate from the surrounding countries. Pop. (1907) 54,437.

Tantalum (tan'ta-lum), a rare metallic element discovered in the Swedish minerals tantalite and yttro-tantalite; chemical symbol Ta, atomic weight 182. It was long believed to be identical with *niobium*, but their separate identity has been established.

Tantalus (tan'ta-lus), in Greek mythology, a son of Zeus, and king of Phrygia, Lydia, Argos or Corinth, who was admitted to the table of the gods, but who had forfeited their favor either by betraying their secrets, stealing ambrosia from heaven, or presenting to them his murdered son Pelops as food. His punishment consisted in being placed in a lake whose waters receded from his lips when he attempted to drink, and of being tempted by delicious fruit overhead which withdrew when he attempted to eat. Moreover, a huge rock forever threatened to fall and crush him.

Tantalus, a genus of wading birds of the heron family. *T. loculator* is the wood-ibis of America, which frequents extensive swamps, where it feeds on serpents, young alligators, frogs, and other reptiles. The African tantalus (*T. ibis*) was long regarded as the ancient Egyptian ibis, but it is rare in Egypt, belonging chiefly to Senegal, and is much larger than the true ibis.

Tantras (tan'tras), a name of certain Sanskrit sacred books, each of which has the form of a dialogue between Siva and his wife. The tantras are much more recent productions than the Vedas, the oldest being long posterior even to the Christian era, although their believers regard them as a fifth Veda, of equal antiquity and higher authority. The Tantrikas, or followers of the tantras, indulge in mystical and impure rites in honor of Siva.

Taoism, or TAOUISM (tă'ō-izm, tou'-izm), a religious system formed in China by Lao-tse. He taught a comparatively pure morality, but in its later developments his doctrine is too

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often associated with magical rites and superstitious observances. See *Lao-tze.*

Taormina (tâ-or-mē'nâ), a town, province of Messina, Sicily, on Monte Tauro, overlooking the Strait of Messina. Its chief interest is in the ancient theater, sepulchers, reservoirs, etc., which are still in good preservation. It is a favorite place of resort for travelers. Pop. 4351.

Taos (tä'ōs), the name of a district and town of New Mexico, about 50 miles N. of Santa Fé, watered by the Rio de Taos, a tributary of the Rio Grande. Here is a fine example of the pueblo Indian architecture, of prehistoric date, yet still inhabited by a large number of Indians. This was the seat of the first Territorial government, was the residence of Kit Carson and Colonel Burt, and has now a town of about 500 inhabitants, a market-place for the Indian farmers surrounding.

Tapajos (tâ-pâ-zhōs'), a river of Brazil, which flows through the province of Para, and enters the Amazon after a northward course of nearly 1200 miles.

Tapestry (tap'es-tri), a kind of woven hangings of wool and silk, often enriched with gold and silver, with worked designs, representing figures of men, animals, landscapes, etc., and formerly much used for lining or covering the walls and furniture of apartments, churches, etc. Tapestry is made by a process intermediate between weaving and embroidery, being worked in a web with needles instead of a shuttle. Short lengths of thread of the special colors required for the design are worked in at the necessary places and fastened at the back of the texture. In Flanders, particularly at Arras (whence the term *arras*, signifying 'tapestry'), during the fifteenth and sixteenth centuries, the art was practiced with uncommon skill. The art of weaving tapestry was introduced into England near the end of Henry VIII's reign. During the reign of James I a manufactory was established at Mortlake, which continued till the beginning of the eighteenth century. Recently a royal school of tapestry has been established at Windsor, and some excellent work has been done by Mr. W. Morris at Merton (Surrey). The first manufacture of tapestry at Paris was set up under Henry IV, in 1606 or 1607, by several artists whom that monarch invited from Flanders. But the most celebrated of all the European tapestry manufactures was that of the Gobelins, instituted under Louis XIV. (See *Bayeux Tapestry* and *Gobelins Manufactory.*) The term *tapestry* is also applied to a variety of woven fabrics having a multiplicity of colors in their design, which, however, have no other characteristic of true tapestry. The name of *tapestry carpet* is given to a showy and cheap two-ply or ingrain carpet, the warp or weft being printed before weaving so as to produce the figure in the cloth.

Tapeti (tap'e-ti), the Brazilian hare, the *Lepus Brasiliensis*, the only hare inhabiting South America.

Tape-worms, the name common to certain internal parasites (Entozoa) constituting the order Cestoidea or Tæniada of the sub-kingdom Annuloida, found in the mature state in the alimentary canal of warm-blooded vertebrates. Tape-worms are composed of a number of flattened joints or segments, the anterior of which, or head (which is the true animal), is furnished with a circlet of hooks or suckers, which enable it to maintain its hold on the mucous membrane of the intestines of its host. The other segments, called *proglottides*, are simply generative organs budded off by the head, the oldest being furthest removed from it, and each containing when mature male and female organs. The tape-worm has neither mouth nor digestive organs, nutrition being effected by absorption through the skin. The length of the animal varies from a few inches to several yards. The ova do not undergo development in the animal in which the adult exists. They require to be swallowed by some other warm-blooded vertebrate, the ripe proglottides being expelled from the bowel of the host with all their contained ova fertilized. The segments or proglottides decompose and liberate the ova, which are covered with a capsule. After being swallowed the capsule bursts and an embryo, called a *proscolex*, is liberated. This embryo, by means of spines, perforates the tissues of some contiguous organ, or of a blood-vessel, in the latter case being carried by the blood to some solid part of the body, as the liver or brain, where it surrounds itself with a cyst, and develops a vesicle containing a fluid. It is now called a *scolex* or *hydatid*, and formerly was known as the *cystic worm.* The scolex is incapable of further development till swallowed and received a second time into the alimentary canal of a warm-blooded vertebrate. Here it becomes the head of the true tape-worm, from which proglottides are developed posteriorly by gemmation, and we have the adult animal with which the cycle begins. Eight true tape-worms oc-

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cur in man, *Tænia solium*, the cystic form of which produces the measles of the pig, being the most common. Another, *T. mediocanellata*, is developed from the scolex, which causes measles in the ox. The tape-worm of the dog, *T. serrata*, is the adult form of the scolex which produces staggers in sheep. *T. Echinococcus* of the dog produces hydatids in man, through the development in man of its immature young. In all cases the only conclusive sign of tape-worm is the passage of one or part of one in the fæces. One mode of treatment for this disorder is, for an adult, a teaspoonful of the extract of male-fern. A few hours thereafter a strong dose of castor-oil should be taken.

Tapioca (tap-i-ō'ka), a farinaceous substance prepared from cassava meal, which, while moist or damp, has been heated for the purpose of drying it on hot plates. By this treatment the starch-grains swell, many of them burst, and the whole agglomerates in small irregular masses or lumps. In boiling water it swells up and forms a viscous jelly-like mass. See *Cassava*.

Tapir (tā'per), the name of ungulate or hoofed animals forming the family Tapiridæ. The nose resembles a short fleshy proboscis; there are four toes to the fore-feet, and three to the hind ones. The common South American tapir (*Tapirus americanus*) is the size of a small ass, with a brown skin, nearly naked. It inhabits forests, lives much in the water, conceals itself during the day, and feeds on vegetable substances. There are several other Ameri-

Malay Tapir (*Tapirus malayanus*).

can species. The *T. malayanus* or *indicus* is found in the forests of Malacca and Sumatra. It is larger than the American species, and is a most conspicuous animal from the white back, rump, and belly contrasting so strongly with the deep sooty black of the rest of the body as, at a little distance, to give it the aspect of being muffled up in a white sheet. Fossil tapirs are scattered throughout Europe, and among them is a gigantic species, *T. giganteus*, Cuvier, which in size must have nearly equaled the elephant.

Tapping (tap'ing), or PARACENTE'SIS, a surgical operation commonly performed for dropsy, but also for empyema, and for the relief of other morbid effusions in natural or accidental cavities of the body. It consists in piercing the wall of the cavity with an instrument, commonly a trocar or a bistoury. The fluid usually flows out, but it is sometimes necessary to use an instrument which acts as a syringe.

Taprobane (ta-prob'a-nē), the ancient name of Ceylon. See *Ceylon*.

Tapti, or TAPTEE (täp'tē), a river in Hindustan, rises in the Nerbudda division of the Central Provinces, and after a course of about 460 miles falls by several mouths into the Gulf of Cambay, 20 miles below Surat and 30 miles south of the mouth of the Nerbudda.

Taqua-nut (ta'kwa), the seed or nut of the South American tree *Phytelĕphas macrocarpa*, known under the name of vegetable ivory. The fruit is as large as a man's head and contains numerous nuts of a somewhat triangular form, each as large as a hen's egg. When ripe they are exceedingly hard and white, resembling ivory very closely and being used for similar purposes.

Tar (tär), a thick, dark-colored, viscid product obtained by the destructive distillation of organic substances and bituminous minerals, as wood, coal, peat, shale, etc. Wood-tar, such as the Archangel, Stockholm, and American tars of commerce, is obtained by burning billets of wood slowly in a conical cavity at the bottom of which is a cast-iron pan into which the tar exudes. Wood-tar is also obtained as a by-product in the destructive distillation of wood for the manufacture of wood-vinegar (pyroligneous acid) and wood-spirit (methyl alcohol). It has an acid reaction, and contains various liquid matters, of which the principal are methyl-acetate, acetone, hydrocarbons of the benzene series, and a number of oxidized compounds, as carbolic acid. Paraffin, anthracene, naphthalene, chrysene, etc., are found among its solid products. It possesses valuable antiseptic properties, owing to the creasote it contains, and is used extensively for coating and preserving timber, iron, and cordage. Coal-tar, which is largely obtained in gas manufacture, is also valuable inasmuch as it

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is extensively employed in the production of dyes, etc. See *Coal-tar* and *Aniline.*

Tara (tä'ra), or TARO, the native name given to plants of the genus *Colocasia*, nat. order Araceæ, especially *C. esculenta* and *C. macrorhiza*, cultivated in the Pacific Islands for their esculent root, which, though pungent and acrid raw, becomes palatable when cooked. A pleasant flour is also made of the roots or tubers, and the leaves are used as spinach. The name is also given to the allied *Caladium esculenta*, whose tuberous root and leaves are used in the same manner.

Tara Fern, a species of fern (*Pteris esculenta*) from the root or rhizome of which a flour was obtained which formerly made a staple article of food for the natives of New Zealand.

Tarai (ta-rī'; 'moist land'), a moist and jungly tract of Northern India, running along the foot of the first range of the Himalayas for several hundred miles, with a breadth of from 2 to 15, infested by wild beasts, and generally unhealthy. The name is given distinctively to a district in the Kumaun division of the Northwest Provinces, consisting of a strip of country of about 90 miles in length E. and W. along the foot of the Himalayas, and about 12 miles in breadth. Area, 938 square miles. Pop. 118,422.

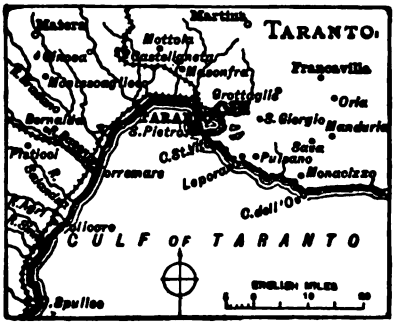
Taranaki (tä-rä-nä'kē; formerly *New Plymouth*), a provincial district of New Zealand, on the west coast of North Island. Its coast-line extends to 130 miles, and it has an area of 3339 square miles. The coast is almost without indentations, and has no good natural harbors. Nearly three-fourths of this district is covered by valuable forests, and the rest is adapted for cattle rearing. There is a good coal-field on the banks of the Mokau, and the titaniferous iron-sand, which lies from 2 to 5 feet deep along the sea-beach, is believed to be the purest iron ore known. The soil is excellent, and a moist climate and temperate atmosphere render vegetation luxuriant. New Plymouth is the chief town, and has direct railway communication with Wellington and other parts of the colony. Mount Egmont, an extinct volcano, in the southwest, where the surface is most elevated, attains a height of 8270 feet, and is in many respects the most remarkable mountain in the colony. Pop. 38,000.

Tarantass (tar-an-tas'), a large covered traveling carriage without springs, but balanced on long poles which serve the purpose, and without seats, much used in Russia.

Tarantella (tar-an-tel'a), a swift, whirling Italian dance in six-eight measure.

Tarantism (tar'an-tizm), a leaping or dancing mania, of the mediæval period, somewhat similar to the disease called St. Vitus' dance. It was ascribed to the bite of the tarantula.

Taranto (tä'rän-tō; anciently *Tarentum*), a fortified seaport of S. Italy, in the province of Lecce, on a rocky peninsula at the northern extremity of the gulf of same name. It is well built, and contains a cathedral and several other churches, a diocesan seminary, and several hospitals. The manufactures include linen, cotton, velvet,



muslin and gloves. There is now a proposal for making Taranto a station of the Italian navy. The ancient Tarentum was founded by the Greeks in B.C. 708, and became a powerful city. It was captured by the Romans B.C. 272, and remained a notable Roman town until the downfall of the empire. Pop. 50,592.

Tarantula (ta-ran'tū-la), a kind of spider, the *Lycosa tarantula*, found in some of the warmer parts of Italy. When full grown it is about the size of a chestnut, and is of a brown color. Its bite was at one time supposed to be dangerous, and to cause a kind of dancing disease; it is now known not to be worse than the sting of a common wasp. In America the term is given to the large mygalid spiders.

Tarapacá (tä-rä-pä-kä'), a coast province of Northern Chile, containing deposits of niter and borax and silver mines; area, 18,131 square miles. Capital, Iquique. Pop. 101,105.

Tarare (tä-rär), a town of France, in the department of the Rhone, 20 miles northwest of Lyons. Silks, velvets, and muslins are made. Pop. 11,791.

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Tarascon (tȧ-răs-kon), a town of Southern France, department of Bouches-du-Rhône, on the Rhone, opposite Beaucaire, 50 miles N. N. W. of Marseilles. It has interesting mediæval structures. Pop. (1906) 5447.

Taraxacin (ta-rak'a-sin), a bitter crystallizable principle contained in the milky juice of the dandelion (*Leontŏdon Taraxăcum*), especially in the juice of the roots. It possesses tonic, aperient, and diuretic properties.

Tarazona (tȧ-rȧ-thō'nȧ), an episcopal city of Spain, in the province of Saragossa, 57 miles W. N. W. of the town of Saragossa, on the Queiles. There is here an ancient episcopal palace and a cathedral, founded about the thirteenth century. Pop. 8790.

Tarbell (tar'bel), Ida M., writer, born in Erie Co., Pennsylvania, in 1857; was associate editor of the *Chautauquan*, 1883-91, and of *McClure's Magazine* after 1894. She attracted attention by her vigorous arraignment of the Standard Oil Company and its methods, also wrote *Lives* of Napoleon, Lincoln, Madame Roland, etc.

Tarbes (tȧrb), a town of France, capital of the department of Hautes Pyrénées, situated 110 miles south of Bordeaux, on the left bank of the Adour. Its principal edifices are the cathedral, and the church of St. John (fourteenth century). The manufactures embrace leather, woolens, machinery, weapons, etc. Pop. 20,866.

Tarboosh (tar'bösh), a red woolen skull-cap or fez, usually ornamented with a blue silk tassel, and worn by the Egyptians, Turks, and Arabs.

Tardigrada (tar-di-gra'da; 'slow steppers'), the name applied by Cuvier to the family of edentate mammals, which includes the existing sloths and the extinct Megatherium.

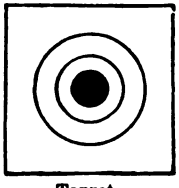
Tare (tȧr), the common name of different species of *Vicia*, a genus of leguminous plants, known also by the name of *vetch*. There are numerous species and varieties of tares or vetches, but that which is found best adapted for agricultural purposes is the common tare (*Vicia sativa*), of which there are two principal varieties, the summer and winter tare. They afford excellent food for horses and cattle, and hence are extensively cultivated throughout Europe. (See *Vetch*.) The *tare* mentioned in Scripture (Mat. xiii, 36) is supposed to be the darnel (which see). *V. sativa* is found in fields in the United States.

Tare, in commerce, a deduction made from the gross weight of goods as equivalent to the real or approximate weight of the cask, box, bag, or other package containing them. Tare is said to be *real* when the true weight of the package is known and allowed for, *average* when it is estimated from similar known cases, and *customary* when a uniform rate is deducted.

Tarentum (ta-ren'tum), a borough of Allegheny Co., Pennsylvania, on the Allegheny River, 21 miles N. E. of Pittsburgh. There are large plate and flint glass factories and steel mills, with various other industries. Pop. 7414.

Tarentum. See *Taranto*.

Target (tȧr'get), (1) a shield or buckler of a small kind, such as those formerly in use among the Highlanders, which were circular in form, cut out of ox-hide, mounted on strong wood, strengthened by bosses, spikes, etc., and often covered externally with a considerable amount of ornamental work. (2) The mark set up to be aimed at in archery, musketry, or artillery practice and the like. The targets used in rifle practice are generally square or oblong metal plates, and are divided into three or more sections, called *bull's eye*, *inner* (or *center*), and *outer*, counting from the center of the target to its edges; some targets have an additional division (called a *magpie*), situated between the outer and the inner. It is the marksman's aim to put his shots as near the central point as possible, as if he hits the bull's-eye there are counted in his favor 5 points, the center 4 points, the magpie 3 points, and the outer 2 points, or some similar proportions.



Target.

Targum (tȧr'gum), a translation or paraphrase of the Hebrew Scriptures in the Aramaic or Chaldee language or dialect, which became necessary after the Babylonish captivity, when Hebrew began to die out as the popular language. The Targum, long preserved by oral transmission, does not seem to have been committed to writing until the first centuries of the Christian era. The most ancient and valuable of the extant Targums are those ascribed to or called after Onkelos and Jonathan Ben Uzziel. All the Targums taken together form a paraphrase of the whole of the Old Testament, except Nehemiah, Ezra, and Daniel.

Tarifa (tȧ-rē'fȧ), a maritime town of Spain, in Andalusia, 52 miles southeast of Cadiz, and the most south-

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erly town in Europe. It is surrounded by fortifications built by the Moors, and contains a very ancient Moorish castle. Pop. 11,730.

Tariff (tar'if), a list or table of duties or customs to be paid on goods imported or exported, whether such duties are imposed by the government of a country or agreed on by the governments of two countries holding commerce with each other. The tariff depends upon the commercial policy of the state by which it is framed, and the details are constantly fluctuating. The tariff has long been a leading political problem in the United States, and has fluctuated with the dominance of one or the other great party, the Republicans favoring a high tariff, protective of the manufacturing interests, the Democrats a low one, confined to revenue purposes. The opposition to a high tariff at first came from New England, but was afterwards shifted to the South, becoming so strong by 1832 as to lead to an attempt on the part of South Carolina to secede from the Union. A lower tariff policy was then adopted, and there were several changes until 1861, when the high tariff of the war period was adopted. The Republican party being long afterward in the ascendency, the high tariff was continued until 1894, when the Democratic party was in power and passed a tariff bill much lowering the rates of duty. In 1897 they were again increased. During the succeeding years the feeling developed that they were too high and in 1909 a new bill was passed making many reductions yet leaving some leading articles in an unsatisfactory state. The policy of partial revision then came into favor, a permanent commission being appointed to study the several items subject to customs duties and recommend such changes as seemed desirable. At the end of 1911 this commission made an elaborate report on the wool industry, as a guide to the deliberations of Congress. The Democratic Congress passed a new tariff law in 1913, the main features of which were a longer free list. A Tariff Commission forms a part of the Revenue Bill passed by the House in 1916, and provides for a board of six members, appointed by the President, with the consent of the Senate, of which not more than three shall be of one political party. Its duty is to investigate the administration and fiscal effects of the tariff laws.

Tarlatan (tär-la-tan), a thin and fine fabric of cotton, mostly used for ladies' ball dresses. It is cheap, but does not stand washing.

Tarn (tärn), a river of Southern France, which rises on the south slope of Mount Lozère, near Florac, in the department of Lozère; flows through the departments of Aveyron, Tarn, Haute-Garonne and Tarn-et-Garonne; and finally joins the Garonne. Its whole course is 230 miles, of which about 100 miles, beginning at Alby, are navigable.

Tarn, a department of Southern France, named from the above river; area, 2218 sq. miles. The surface is intersected by hills, which generally terminate in flat summits, on which, as well as their sides, cereals and vines are cultivated. The minerals include iron and coal, both of which are partially worked. Woolens, linens, hosiery, etc., are manufactured. The capital is Alby. Pop. (1906) 330,533.

Tarn-et-Garonne, a department of France, named after its two chief rivers; area, 1436 square miles. This department belongs to the basin of the Garonne, which traverses it south to northwest, and receives within it the accumulated waters of the Tarn and Aveyron, which are both navigable. The arable land raises heavy crops of wheat, maize, hemp, tobacco, grapes and fruit of all kinds The most important manufactures consist of common woolen cloth and serge, linen goods, silk hosiery, cutlery, leather, etc. Montauban is the capital. Pop. (1906) 188,553.

Tarnopol (tär-no'pōl), a town of Galicia, Austria, on the left bank of the Sereth, 80 miles E. S. E. of Lemberg. It contains a Russian Catholic and a Greek Catholic church, castle, Jesuit college, gymnasium, etc. The inhabitants are chiefly employed in agriculture. Pop. 32,082.

Tarnow (tär'nöf), a town of Galicia, Austria, on a height above the right bank of the Biala, 48 miles E. S. E. of Cracow. It is well built, is the see of a bishop, has a cathedral, monastry, gymnasium, synagogue, infirmary, and manufactures of linen and leather. Pop. 31,691.

Tarnowitz (tär'nō-vits), a town of Prussia, in the province of Silesia, not far from the Polish frontier, with mines of iron and lead. Pop. 11,858.

Taro (tä'rō), a plant of the genus *Colocasia*. See *Tara*.

Tarpan (tär'pan), the wild horse of Tartary, belonging to one of those races which are by some authorities regarded as original. It is about the size of an ordinary mule. The color is invariably tan or mouse, with black mane and tail. During the cold season the hair is long and soft, but in sum-

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mer much of it is shed. They are sometimes captured by the Tartars, but are reduced with great difficulty to subjection.

Tarpan.

Tarpaulin (tär-pa'lin), canvas well coated with tar, and used to cover the hatchways, boats, etc., on shipboard, and also to protect agricultural produce, goods in transit, etc., from the effects of the weather.

Tarpeian Rock (tär-pē'an), a precipitous rock forming part of the Capitoline Hill at Rome over which persons convicted of treason to the state were hurled. It was so named, according to tradition, from *Tarpeia*, a vestal virgin of Rome, and daughter of the governor of the citadel on the Capitoline, who, covetous of the golden bracelets worn by the Sabine soldiery, opened the gate to them on the promise of receiving what they wore on their left arms. Once inside the gate they threw their shields upon her, instead of the bracelets. She was buried at the base of the Tarpeian Rock.

Tarpon (tär'pun), or TARPUM, the *Megalops atlanticus*, a herring-shaped fish found on the southern coasts of the United States and in the West Indies. It reaches a length of 5 or 6 feet, and from a hundred to several hundred pounds weight, and is of giant strength. Though too coarse ordinarily for food, it is a great attraction to anglers. Its scales, which are of great size, are now largely used in ornamental work.

Tarquinius (tär-kwin'i-us), LUCIUS, surnamed *Priscus* (the first or the elder), in Roman tradition the fifth king of Rome. The family of Tarquinius was said to have been of Greek extraction, his father, Demaratus, being a Corinthian who settled in Tarquinii, one of the chief cities of Etruria. Having removed with a large following to Rome, Tarquinius became the favorite and confidant of the Roman king, Ancus Martius, and at his death was unanimously elected his successor. According to Livy he made war with success on the Latins and Sabines, from whom he took numerous towns. Tarquinius also distinguished his reign by the erection of the Cloaca Maxima, the Forum, the wall round the city, and, as is supposed, he commenced the Capitoline Temple. After a reign of about thirty-six years he was killed in B.C. 578 by assassins, who were employed by the sons of Ancus Martius.

Tarquinius, LUCIUS, surnamed *Superbus* ('the proud'), the last of the legendary kings of Rome, was the son of Lucius Tarquinius Priscus. Tarquin, on reaching man's estate, murdered his father-in-law, King Servius Tullius (the date usually given for this event is B.C. 534), and assumed the regal dignity. He abolished the privileges conferred on the plebeians; banished or put to death the senators whom he suspected, never filled up the vacancies in the senate, and rarely consulted that body. He continued the great works of his father, and advanced the power of Rome abroad both by wars and alliances. By the marriage of his daughter with Octavius Mamilius of Tusculum, the most powerful of the Latin chiefs, and other political measures, he caused himself to be recognized as the head of the Latin confederacy. After a reign of nearly twenty-five years a conspiracy broke out by which he and his family were exiled from Rome (B.C. 510), an infamous action of his son Sextus being a chief cause of the outbreak. (See *Lucretia.*) He tried repeatedly, without success, to regain his power, and at length died at Cumæ in 495 B.C.

Tarragon (tär'a-gon; *Artemisia Dracunculus*), a strong erect perennial plant of the composite order, a native of Siberia, cultivated in gardens for flavoring dishes.

Tarragona (tär-a-gō'nȧ), a seaport of Spain, capital of a province of its own name, on the Francoli, at its mouth in the Mediterranean, on a limestone rock. The chief building is the large cathedral, a fine Gothic building partly of the eleventh century. The town was founded by the Phœnicians, and became of great importance under the Romans. In its environs are an ancient amphitheater, a circus, an aqueduct, etc. It was taken and sacked by the French under Suchet in 1811. It has a trade in corn, oil, wine, fruit, etc. Pop. 26,281.

Tarrasa (tär-rä'sȧ), a town of Spain, province of Barcelona, with

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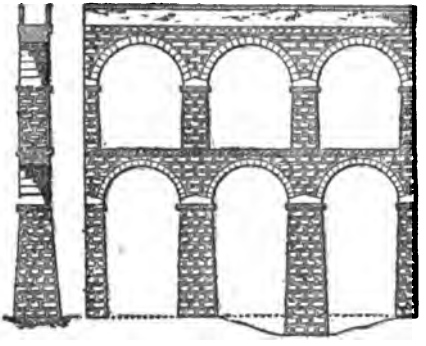
manufactures of cottons and woolens. Pop. 15,956.



Aqueduct of Tarragona.

Tarrytown, a village of Westchester Co., New York, on the Hudson River, 25 miles N. of New York City. It has several manufacturing industries; but is largely residential. Pop. (with North Tarrytown) 11,000.

Tarshish (tär'shish), a place frequently mentioned in the Old Testament. It is now generally identified by biblical critics with the Tartessus of the Greek and Roman writers, a district in Southern Spain, near the mouth of the Guadalquivir, settled by the Phœnicians.

Tarsia-work (tär'si-a), a kind of mosaic woodwork or marquetry much in favor in Italy in the fifteenth century. It was executed by inlaying pieces of wood of different colors and shades into panels of walnut-wood, so as to represent landscapes, figures, fruits, flowers, etc. At Sorrento and other places the manufacture of wood-mosaic, in modern times, has become celebrated.

Tarsius (tär'si-us), a genus of quadrumanous mammals of the lemur family inhabiting the Eastern Archipelago. In this genus the bones of the tarsus are very much elongated, which give the feet and hands a disproportionate length. *Tarsius spectrum*, the tarsier, seems to be the only species known. It is about the size of a squirrel, fawn-brown in color, with large ears, large eyes, and a long tufted tail. It is nocturnal in its habits, lives among trees, and feeds upon lizards.

Tarsus (tär'sus), in anatomy, that part of the foot which in man is popularly known as the ankle, the front of which is called the instep. It corresponds with the wrist of the upper limb or arm, and is composed of seven bones. (See *Foot.*) In insects the tarsus is the last segment of the leg. It is divided into several joints, the last being generally terminated by a claw, which is sometimes single and sometimes double. In birds the tarsus is that part of the leg (or properly the foot) which extends from the toes to the first joint above; the shank.

Tarsus, an ancient city of Asia Minor, the capital of Cilicia, now in the province of Adana, in Asiatic Turkey. The Apostle Paul was born, and Julian the Apostate was buried there. Its inhabitants enjoyed the privileges of Roman citizens, and the city rose to such distinction as to rival Athens, Antioch and Alexandria. It is situated on both banks of the Cydnus, and has a considerable trade. Pop. about 25,000.

Tartan (tär'tan), a kind of vessel used in the Mediterranean, both for commercial and other purposes. It is furnished with a single mast on which is rigged a large lateen sail; and with a bowsprit and fore-sail. When the wind is aft a square sail is generally hoisted.

Tartan, a well-known species of cloth checkered or cross-barred with threads of various colors. It was originally made of wool or silk, and constituted the distinguishing badge of the Scottish Highland clans, each clan having its own peculiar pattern. An endless variety of fancy tartans are now manufactured, some of wool, others of silk, others of wool and cotton, or of silk and cotton.

Tartar (tär'tar), the substance called also *argal* or *argol*, deposited from wines incompletely fermented, and adhering to the sides of the casks in the form of a hard crust. When purified it forms cream of tartar. (See *Argal, Cream of Tartar.*) What is called *tartar emetic* is a double tartrate of potassium and antimony, an important compound used in medicine as an emetic, purgative, diaphoretic, sedative, febrifuge, and counter-irritant. *Tartar of the teeth* is an earthy-like substance which occasionally concretes upon the teeth, and is deposited from the saliva. It consists of salivary mucus, animal matter, and phosphate of lime.

Tartaric Acid (tär-tar'ik; $C_4H_6O_6$), the acid of tartar. It exists in grape juice, in tamarinds, and several other fruits; but principally in bitartrate of potassium, or cream of tartar, from which it is usually obtained. It crystallizes in large rhombic prisms,

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transparent and colorless, and very soluble in water. It is inodorous and very sour to the taste. A high temperature decomposes it, giving rise to several new products. The solution of tartaric acid acts with facility upon those metals which decompose water, as iron and zinc. There are five modifications of tartaric acid, characterized chiefly by the differences in the action exerted by them upon a ray of polarized light; such as dextro-ordinary tartaric acid, lævo-tartaric acid, para-tartaric or racemic acid, meso-tartaric acid, and meta-tartaric acid. Tartaric acid is largely employed as a discharge in calico-printing, and for making soda-water powders and baking powders. In medicine it is used in small doses as a refrigerant.

Tartars (tär'tarz), or TATARS, a vague term with no ethnological significance, usually applied to certain roving tribes which inhabited the steppes of Central Asia. More specifically, however, Tatar or Ta-ta appears to have been the name of a tribe of Mongols who occupied about the ninth century a district of Chinese Tartary on the Upper Amur. Though Tatar is the native form of their name, it has long been anglacized as Tartar, which is the form in common use, while their country is known as Tartary. The true Tartars formed part of the horde of Genghis Khan, when that conqueror carried his arms from the country known as Chinese Tartary to Europe, as well as to the successive hordes of similar origin who followed in their footsteps, and to the districts from which they came, or in which they settled; hence the names of Chinese Tartary, Independent Tartary, and European or Little Tartary, which comprised most of the Russian governments of Orenburg, Astrakhan, Ekaterinoslav, the Cossack provinces, and the Crimea.

Tartarus (tär'ta-rus), a deep and sunless abyss, according to Homer and the earlier Greek mythology, as far below Hades as earth is below heaven. It was closed by iron gates, and in it Jupiter imprisoned the rebel Titans. Later poets describe Tartarus as the place in which the spirits of the wicked receive their due punishment; and sometimes the name is used as synonymous with Hades, or the lower world in general.

Tartary (tär'ta-ri), a name formerly applied to the wide band of country extending through Central Asia from the seas of Japan and Okhotsk in the east to the Caspian on the west, and including Manchuria, Mongolia, Turkestan, and all the south part of Russian Asia. It was used sometimes even to include a large portion of Southeastern Russia. In a restricted sense it is identical with Turkestan. It received its names from the Tartars or Tatars.

Tartrate (tär'trāt), a salt of tartaric acid. Some of the tartrates are of considerable importance, such as tartar emetic and Rochelle salts. See *Tartar, Rochelle Salts.*

Tarudant (tä-rö-dänt'), a town of Morocco, at the southern foot of the Atlas, about 30 miles east from the Atlantic. Pop. about 8500.

Tashkent (täsh-kent'), or TASH-KEND', a town of Asiatic Russia, in the government of Turkestan, formerly in the khanate of Khokand, on the Tchirshik, near its confluence with Sir-Daria or Jaxartes, in a fertile oasis. It is surrounded by a lofty wall of dried bricks, about 12 miles in circuit, and is entered by twelve gates. The streets are very narrow, and the houses, composed of mud, are mean looking. The principal buildings are the castle, several large mosques, a bazaar, numerous colleges, and a number of old temples. The manufactures are silk, cotton, gunpowder, iron, etc. The trade, carried on chiefly by caravans, is very extensive. Tashkent was taken possession of by Russia in 1865. Pop. (1912) 271,700.

Tasimeter (ta-sim'e-ter), an apparatus for measuring changes in length, temperature, etc., of bodies, by means of variations in the electrical conductivity of carbon, the result of pressure.

Tasmania (taz-mā'ni-ä), formerly Van Diemen's Land, an island in the Southern Ocean, fully 100 miles south of Australia, from which it is separated by Bass Strait; greatest length, 186 miles; mean breadth, 165 miles; area, 24,330 square miles, or including islands, 26,215. The island may be roughly described as heart-shaped. The coasts, which are all much broken and indented, have some excellent harbors. The islands belonging to Tasmania are numerous, the principal being the Furneaux group, on the northeastern extremity. Tasmania is traversed by numerous mountain ranges, the chief summits of which are Mount Humboldt, 5520 feet; Mount Wellington, 4195 feet; and Ben Lomond, 5002 feet. The prevailing rocks are crystalline, consisting of basalt, granite, gneiss, quartz, etc. The chief rivers are the Derwent, the Huon, the Arthur, and the Tamar. There are several large lakes, Lake Westmoreland (45 sq. miles) being the largest. The climate is very mild. Mount Wellington is frequently covered with snow in the summer

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months; but at Hobart, in its immediate vicinity, snow never falls. The mean temperature throughout the year is about 55°.4. The average rainfall is about 24.05 inches. Much of the soil of Tasmania is well adapted for cultivation. Wheat, oats, barley, potatoes, pease, beans, and hops are largely cultivated, and the fruit includes grapes, cherries, plums, quinces, mulberries, peaches, apricots, walnuts, filberts, almonds, etc. Fruit-preserving forms an important industry. Woodland was formerly general and much of it still remains. Kangaroos and other herbivorous animals of the pouched kind are numerous. There are also two marsupial carnivorous animals called the Tasmanian wolf and the Tasmanian devil, both of which are destructive to sheep. The natural forests are chiefly of the eucalyptus or gum-tree, pine, and acacia tribe. Among the minerals are gold, silver, copper, iron, tin, coal, freestone, limestone, and roofing slate. Smelting-works have been erected at Hobart for the iron which abounds in that district. The staple export from Tasmania is wool, and the other articles include gold, tin, timber, grain, fruit, hides, and bark. The frozen meat trade with Britain is large and important. Hobart, the capital, on a fine inlet of the south coast, and Launceston, on an inlet of the north, are the chief towns. Education is compulsory, and the higher education is under a council, which holds examinations and grants degrees.

Tasmania was discovered in 1642 by Abel Jansen Tasman, who named it after Van Diemen, the governor of the Dutch East Indies. It was visited by Cook in 1769, and during the next twenty years by various navigators. In 1797 Bass discovered the strait which has been called after him. The first settlement was made in 1808 by a guard with a body of convicts, who settled at Restdown, but afterwards removed to the site now occupied by Hobart. The development of the country made slow progress until the land was divided into small allotments and farming stock and government pensions reckoned as capital. Convict labor was supplied, and at a very moderate expense farms were cleared for cultivation. Sheep, cattle, and horses were introduced, and the raising of stock has always been carried on with great success. Until 1824 Tasmania was a dependency of New South Wales, but in that year it was made an independent colony. It became one of the states of the Commonwealth of Australia in 1901. For a series of years the prosperity of the colony was retarded by the hostility of the natives and the depredations of escaped convicts, known by the name of bush-rangers. The aborigines have ceased to exist, in 1853 deportation was abolished, and about the same time the name of Tasmania was officially adopted on the petition of the colonists. Pop. 181,100.

Tasmanian Devil. See *Dasyure.*

Tasmanian Wolf. See *Thylacine.*

Tasmanite (taz'man-it), a translucent, reddish-brown fossil resin, occurring in Tasmania.

Tasmannia (taz-man'i-a), a genus of plants, consisting of one Tasmanian and two Australian shrubs, nat. order Magnoliaceæ. The Tasmanian species, *T. odorata*, possesses aromatic qualities, particularly in its bark. Its fruit is used by the colonists for pepper.

Tassisudon (tăs-sē-sō-don'), capital of Bhutan State, and situated on the Godáda River about 130

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miles N. w. of Goálpára. There is a palace where the Deb Rájá resides.

Tasso (tas'ō), BERNARDO, an Italian epic and lyric poet, father of the more famous Torquato, born of an ancient family at Bergamo in 1493; was educated with great care; entered the service of Guido Rangone, general of the pope, as a political emissary; and became secretary to the Prince of Salerno, whom he accompanied to Tunis. In 1539 he married Porzia de Rossi and retired to Sorrento. Subsequently he received the patronage of the Duke of Urbino, and in 1563 the Duke of Mantua appointed him governor of Ostiglia, where he died in 1569. He published numerous lyric poems. but his chief work is the epic of *L'Amadigi*, founded on the story of *Amadis de Gaul*.

Tasso, TORQUATO, an eminent Italian epic poet, son of the preceding, was born at Sorrento in 1544. He was early sent to the school of the Jesuits at Naples, and subsequently pursued his studies under his father's superintendence at Rome, Bergamo, Urbino, Pesaro, and Venice. At the age of sixteen he was sent to the University of Padua to study law, but at this time, to the surprise of his friends, he produced the *Rinaldo*, an epic poem in twelve cantos. The reputation of this poem procured for Torquato an invitation to the University of Bologna, which he accepted. Here he displayed an aptitude for philosophy, and began to write his great poem of *Gerusalemme Liberata* ('Jerusalem Delivered'). While engaged on it he secured a patron in Cardinal Louis d'Este, to whom he had dedicated his *Rinaldo*. He was introduced by the cardinal to the court of Alfonso II of Ferrara. Here he remained from 1565 to 1571, when he accompanied the cardinal on an embassy from the pope to Charles IX of France. Having quarreled with his patron, Tasso returned to Ferrara, and in 1573 brought out the *Aminta*, a pastoral, which was represented at the court. In 1575 he completed his epic of *Gerusalemme Liberata*. About this time he became a prey to morbid fancies, believed that he was persistently calumniated at court, and systematically misrepresented to the Inquisition. To such a pass, indeed, had this mania come in 1577 that the poet drew his poignard upon one of the domestics of the Duchess of Urbino. He was immediately arrested, but was set at liberty after two days' confinement. At his own request he returned to Ferrara, to the convent of St. Francis; but from here he made his escape, and traveled in disguise to his native place, Sorrento, where he stayed with his sister Cornelia. He again asked permission to return to Ferrara, a request which the duke coldly granted. But in his excited and jealous condition of mind Tasso found it impossible, to reëstablish the old friendly relationship at the court. He fled from Ferrara again, but again returned. So outrageous had his conduct now become that he was seized by the duke's orders and confined as a madman in the hospital of St. Anne at Ferrara. Here he remained from 1579 to 1586, until he was released at the solicitation of Vincent di Gonzaga. Broken in health and spirit, he retired to Mantua, and then to Naples. Finally, in 1595, he proceeded to Rome at the request of the pope, who desired him to be crowned with laurel in the capitol, but the poet died while the preparations for the ceremony were being made. Tasso wrote numerous poems, but his fame rests chiefly on his *Rime* or lyrical poems, his *Aminta*, and his *Gerusalemme Liberata* (translated into English by Fairfax). His letters are also interesting.

Tassoni (tas-sō'nē), ALESSANDRO, an Italian poet, born in 1565; died in 1635; chiefly known from his mock-heroic poem *La Secchia Rapita* ('The Stolen Bucket'), founded on an incident that gave rise to war between the Modenese and Bolognese in the thirteenth century.

Taste (tāst), the sense by which we perceive the relish or savor of a thing. The organs of this special sense are the *papillæ*, or processes on the surface of the tongue, and also certain parts within the cavity of the mouth and the throat, as the soft palate, the tonsils, and the upper part of the pharynx. See *Tongue*.

Tatar-Bazarjik (tä-tär'pä-zär-jēk'), a town in Eastern Roumelia on the Maritza. Pop. 17,549.

Tatars. See *Tartars*.

Tate (tāt), NAHUM, an English poet, was born in Dublin about the year 1652; received his education in Trinity College; went to London, where he engaged in literary pursuits; was appointed poet laureate; and died in the Mint, whither he had retired from his creditors, in 1715. He was the author of several dramatic pieces; assisted Dryden in the second part of *Absalom and Achitophel;* altered and arranged Shakespeare's *King Lear* for the stage; and wrote, in conjunction with Dr. Nicholas Brady, the metrical version of the Psalms which used to be appended to the English Book of Common Prayer.

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Tatian (tā'shyan), a heresiarch of the second century, was born in Assyria about 120, and died about 172. He was educated in Greek philosophy; traveled extensively; caused himself to be initiated in the rites of various religions; and eventually embraced Christianity. Tatian became a disciple of Justin, after whose martyrdom he left Rome and journeyed into Mesopotamia, where he preached certain Gnostic and heretical doctrines. He seems to have disbelieved in the divinity of Christ, and his teaching inculcated abstinence from wine, from animal flesh, and from marriage. As a Christian apologist he wrote *Oratio ad Græcos*, which is still extant, and his *Diatessaron* seems to prove the existence of four gospels about the middle of the second century.

Tatius, ACHILLES. See *Achilles Tatius.*

Tatouay (tat'ō-ā), a kind of armadillo (*Dasypus tatouay*, or *Xenurus unicinctus*) remarkable for the undefended state of its tail, which is devoid of the bony rings that inclose this member in the other armadillos, being only covered with brown hair.

Tatra (tä'trà). See *Carpathian Mountains.*

Tatta (tä'tä), a town in Karáchi District, Sind, on the Indus, about 60 miles east of Karáchi. Tatta has some manufactures of cotton and silk goods, but its commercial importance has greatly declined. Pop. 10,783.

Tattersall's (tat'er-salz), Knightsbridge Green, London, is the great metropolitan mart for horses, and headquarters of the turf, removed in 1865 from Grosvenor Place, where it was established by Richard Tattersall in 1773. A subscription room is open for betters on the turf, where they make and settle their bets.

Tattie (tat'tē), in the East Indies, a thick mat or screen, usually made of the sweet-scented cuscus-grass, and fastened upon a bamboo frame, which is hung at a door or window, and kept moist so as to cool the apartment.

Tatting (tat'ing), a kind of narrow lace used for edging, woven or knitted from sewing-thread, with a shuttle-shaped instrument.

Tattoo (ta-tō'), a beat of drum and bugle-call at night, giving notice to soldiers to repair to their quarters in garrison or to their tents in camp.

Tattooing (ta-tō'ing), a practice common to several uncivilized nations, ancient and modern, and to some extent employed among civilized peoples. It consists in pricking the skin in a design, and introducing into the wounds colored liquids, gunpowder, or the like, so as to make it indelible. This practice is very prevalent among the South Sea Islanders, among whom are used instruments edged with small teeth, somewhat resembling those of a fine comb. Degrees of rank are sometimes indicated by the greater or less surface of tattooed skin.

Tauchnitz (touh'nits). BERNHARD CHRISTIAN, BARON, a German publisher, born in 1816. His establishment at Leipzig, founded in 1837, is widely known from the collection of British authors issued from it, which numbers considerably over 2000 vols., and is continually increasing. Baron Tauchnitz was appointed in 1872 British consul-general for Saxony. He died in 1895.

Taunton (tän'tun, tạn'tun), a parliamentary borough, Somerset, England, on the Tone, 45 miles S. S. W. of Bristol. The principal buildings and institutions are the parish churches of St. James and St. Mary Magdalene; a Wesleyan and a Congregational College; the library, and the museum of the Somersetshire Archæological and Natural History Society; an old market house; the castle; the Shire Hall; a hospital, etc. The town was long celebrated for woolen, and afterwards for silk manufactures, but its chief trade now is in agricultural produce. Taunton is of great antiquity, and was a principal residence of the West Saxon kings. Here Judge Jeffreys held the infamous 'bloody assizes' in 1685. Pop. 21,188.

Taunton, a town, one of the capitals of Bristol Co., Massachusetts, on the Taunton River, 35 miles south of Boston. It is well built and contains a great number of handsome edifices. Its institutions include the Bristol Academy, organized in 1792, and a State insane asylum. Its manufactures are very extensive, embracing many large cotton and yarn mills, silverware factories, stove foundries, and locomotive works; also manufactures of printing presses, nails, shoe buttons, etc. Pop. 34,259.

Taunus (tou'nŏs), a mountain range of Western Germany, mainly in the Prussian province of Hessen-Nassau, extending eastward from the Rhine, north of the Main; highest summit, Great Feldberg, 2886 feet. It is well wooded, and exhibits much picturesque scenery.

Taurida (tạ'rē-dà), a government in the south of Russia, bounded north by Ekaterinoslaf; east by the Sea of Azof; southeast, south, and west by the Black Sea, and northeast by the government of Kherson; area, 24,539

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square miles. It is very irregular in shape and may be regarded as one large peninsula, subdivided into two minor peninsulas, one of which is the Crimea. It is watered by the Dnieper; the northern peninsula consists almost entirely of an extensive steppe, and the chief occupation of the inhabitants, who consist of Russians, is cattle-breeding and agriculture. Pop. 1,634,700. The capital is Simferopol.

Taurus (tą'rus), the Bull, one of the twelve signs of the zodiac, which the sun enters about the 20th April. Taurus is also the second zodiacal constellation, containing, according to the British catalogue, 141 stars. Several of these are remarkable, as Aldebaran, of the first magnitude, in the eye; the Hyades, in the face; and the Pleiades, in the neck.

Taurus, a mountain chain in Asiatic Turkey, stretching for about 500 miles from the Euphrates to the Ægean Sea, latterly running north of the Gulf of Adalia. In the east it takes the name of Ala Dagh, in the west that of Bulghar Dagh. It descends steeply to the sea on the south; northwards it merges gradually into the plateau of Asia Minor. It is connected by the Alma-Dagh with the chain of Lebanon; and by Anti-Taurus, with Ararat, Elburz and the Caucasus.

Tautog (tą'tog), a fish (*Tautoga nigra* or *americana*) found on the coast of New England, and valued for food. See *Blackfish*.

Tautphoeus (tout'fē-ŏs), BARONESS, novelist, daughter of James Montgomery, of Sathill, Ireland, born in 1807; died in 1893. She married a Hungarian nobleman and wrote novels in English, mainly of south German life. They include *The Initials*, *Quits*, and *At Odds*.

Tavernier (tȧ-ver-ne-ā), JEAN BAPTISTE, Baron d'Aubonne, the son of a Dutch merchant settled in Paris, was born at Paris about 1605, and died at Moscow in 1689. Before his twenty-first year he had visited a considerable portion of Europe, and he repeatedly traveled through Turkey, Persia, India, and other Eastern countries, trading as a diamond merchant. In 1669, having realized a large fortune, and obtained a patent of nobility from the French king, he retired to his estate of Aubonne, in the Genevese territories. He compiled, with the aid of French littérateurs, *Nouvelle Relation de l'Intérieur du Serail du Grand Seigneur*, *Six Voyages*, and *Recueil de Plusieurs Relations*, which have been often reprinted and translated.

Tavira (tȧ-vē'rȧ), a seaport of Portugal, province of Algarve, on the Rio Sequa. The town is well built and has a considerable trade, especially connected with the sardine fisheries. Pop. 12,175.

Tavistock (tav'is-tok), a market town of England, county of Devon, in the valley of the Tavy, 16 miles north of Plymouth. It has a guildhall, public library, etc., and some remains of a once magnificent abbey. Copper, tin, manganese, arsenic, and iron are found in the neighborhood. Sir Francis Drake was a native, and the town possesses a colossal statue of him. Pop. 4392.

Tavoy (tȧ-voi'), a district in the Tenasserim division of British Burmah; area, 7150 square miles. The country is mountainous with thick forests and jungles, and the chief rivers are the Tavoy and the Tenasserim. The chief town and the headquarters of the deputy-commissioner is Tavoy, situated about 30 miles from the mouth of the river of the same name. Pop. 22,371.—There is also an Island of Tavoy, the largest and most northern of the extensive chain which fronts the Tenasserim coast. It is about 18 miles long and 2 broad, and on the eastern side there is a well-sheltered harbor called Port Owen.

Tawing (tą'ing), the manufacture of sheep, lamb, and goat skins into white leather. See *Tanning*.

Tax (taks), a contribution levied by authority from people to defray the expenses of government or other public services. A tax may be a charge made by the national or state rulers on the incomes or property of individuals, or on the products consumed by them. A tax is said to be *direct* when it is demanded from the very persons who it is intended or desired should pay it, as, for example, a poll-tax, a land or property-tax, an income-tax, taxes for keeping man-servants, carriages, dogs, and the like. It is said to be *indirect* when it is demanded from one person in the expectation and intention that he shall indemnify himself at the expense of another; as, for example, the taxes called customs, which are imposed on certain classes of imported goods, and those called excise duties, which are imposed on home manufactures or inland production. Taxes are also rates or sums imposed on individuals or their property for municipal, county, or other local purposes, such as police taxes, taxes for the support of the poor (poor-rates), taxes for the repair of roads and bridges, etc. In the United States and elsewhere taxes on real estate form the largest part of the local revenues, mu-

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nicipal revenues being almost entirely raised from this source. Adam Smith has laid down four principles of taxation, which have been generally accepted by political economists. These are: (1) The subjects of every state ought to contribute to the support of the government as nearly as possible in proportion to their respective abilities. (2) The tax ought to be certain, not arbitrary. (3) Every tax ought to be levied at the time or in the manner most convenient for the contributor. (4) Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the state. See also *Income-tax*, *Inheritance-tax*, *Customs*, *Excise*, etc.

Taxaceæ (taks-ā'se-ē), a suborder of Coniferæ, sometimes regarded as a distinct order, comprising the yew-tree (*Taxus*) and other trees or shrubs which inhabit chiefly the temperate parts of Europe, Asia, Africa, and America.

Taxel (taks'el), the North American badger (*Meles labradorica*). Its teeth are of a more carnivorous character than those of the true badger, and it preys on such small animals as marmots. Its burrowing powers are remarkable, its hole often being 30 feet long.

Taxidermy (taks'i-der-mi), the art of preparing and preserving the skins of animals, and also of stuffing and mounting.

Taxodium (taks-ō'di-um), a genus of plants, nat. order Coniferæ. The *T. distichum*, or deciduous cypress, a common ornamental tree grown upon lawns, is a native of North America. The bark exudes a resin which is used by the negroes for dressing wounds, and the roots, which are hollow inside, are used for bee-hives.

Taxodium distichum.

Tay (tā), the longest river in Scotland, and the one that carries to the sea a greater volume of water than any other in the British islands. It rises on the north side of Ben Lui, near the borders of Argyleshire and Perthshire; is known in its earliest course as the Fillan, and enters Lock Tay, after being joined by the Lochy, as the Dochart; issues thence as the River Tay, at Perth widens out into the Firth of Tay, and finally enters the North Sea. Its length is about 120 miles, its greatest breadth in the estuary 3½ miles, and the area drained 2400 square miles. It is navigable as far as Perth, but Dundee is the chief port. The salmon fisheries are important.

Tay, Loch, a loch of Scotland, in the county of Perth, 15 miles long and about 1 mile broad; receiving at its southwest end the Lochy and the Dochart, and discharging at its northeast end at Kenmore by the Tay. It is 100 to 600 feet deep, and is well supplied with fish. On its northwest shores rises Ben Lawers.

Tay Bridge, a great railway bridge in Scotland crossing the estuary of the Tay from Fifeshire to Forfarshire at Dundee. A bridge was built here in 1878, but much of it was blown down by a violent storm in 1879. It was replaced by a much more substantial one, opened in 1887. This is more than 2 miles long, contains 85 piers, carries a double line of rails on a steel floor, and has an average height, above high-water, of 77 feet under four of the spans in the navigable channel. The piers are formed of cylinders embedded in the river bottom, and filled with concrete, while the superstructure is made of brickwork and malleable iron, braced by various stays and arches.

Taygetus (ta-ig'e-tus), a mountain range of Southern Greece (the Morea). See *Greece*.

Taylor (tā'lor), a borough of Lackawanna Co., Pennsylvania, 3 miles S. W. of Scranton. It has silk mills. Pop. 9940.

Taylor, a town of Williamson Co., Texas, 36 miles N. E. of Austin. It has cotton gins, compress oil mills, and other industries. Pop. 7785.

Taylor (tā'lor), Bayard, writer and traveler, was born at Kennett Square, Pennsylvania, in 1825. He learned the trade of a printer, contributed to various magazines, made a journey through Europe on foot in 1844-45, and on his return published *Views Afoot in Europe*. This gained him a position on the staff of the New York

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Tribune. He afterwards traveled extensively, and wrote works under the titles of *Eldorado* (1850); *Central Africa* (1854); *The Lands of the Saracens* (1854); *Visits to India, China, and Japan* (1855); *Northern Travel* (1858); *Crete and Russia* (1859); *Byways of Europe* (1869); and *Egypt and Iceland* (1874). He also published several novels, including *Hannah Thurston*, *The Story of Kennett*, and *John Godfrey's Fortunes*, and a number of volumes of poems. He was for some time United States secretary of legation at St. Petersburg, and later was United States minister at Berlin, where he died December 19, 1878.

Taylor, BROOK, an English mathematician, born at Edmonton in 1685, was educated at Cambridge, and died in 1731. Chosen a fellow of the Royal Society, he became its secretary in 1714, an office which he retained four years. His chief works are: *Methodus Incrementorum Directa et Inversa* (London, 1715), and *Linear Perspective* (London, 1715). He was discoverer of the mathematical formula called *Taylor's Theorem*, of extensive application in the higher mathematics.

Taylor, SIR HENRY, an English writer, born in 1800; died in 1886. At the age of fourteen he entered the navy; afterwards he became a clerk in the storekeeper-general's office; contributed to various periodicals, and undertook the editorship of the *London Magazine*, but soon afterwards accepted an appointment in the colonial office, where he remained for nearly fifty years. His contributions to literature are: *Isaac Comenanus*, a tragedy (1827); *Philip van Artevelde*, a dramatic romance (1834); *The Statesman*, a series of essays (1836); *Edwin the Fair*, historical drama (1842); *The Eve of the Conquest, and other poems* (1845); *Notes from Life* (1847); *Notes from Books* (1849); *The Virgin Widow*, a comedy, afterwards named *A Sicilian Summer* (1850); and *St. Clement's Eve*, romantic drama (1862). He published an *Autobiography* in 1885.

Taylor, ISAAC, a voluminous writer, born at Lavenham, Suffolk, in 1786; died at Stanford Rivers in 1865. His life was passed without any noteworthy incident, and his published works include: *Elements of Thought* (London, 1823), *The Natural History of Enthusiasm* (1829), *The Natural History of Fanaticism* (1833), *Spiritual Despotism* (1835), *Physical Theory of Another Life* (1836), and various others.—His sister, JANE TAYLOR (1783-1824), published *Display*, a tale (1814); *Contributions of Q.Q.*, a series of essays; and, in conjunction with her sister ANN, *Original Poems and Hymns for Infant Minds*.—His son, ISAAC TAYLOR, canon of York, was born in 1829, and graduated as a wrangler at Trinity College, Cambridge, in 1853. He is the author of *Words and Places* (1864); *Etruscan Researches* (1874); *Greeks and Goths* (1879); *The Alphabet, an Account of the Origin and Development of Letters* (1883); *Origin of the Aryans* (1889), etc.

Taylor, JAMES EDWARD, artist, born at Cincinnati, Ohio, in 1839. He began the study of art, but left it to engage in the Civil war. In 1863 he became artist and war correspondent for Frank Leslie; in 1867 was artist with the Peace Commission to the Indians. One of his best paintings is *The Last Grand Review*, made for General Sherman. Others of his paintings are in the Congressional Library at Washington. He died June 22, 1901.

Taylor, JEREMY, one of the greatest names in the Church of England, was born in 1613 at Cambridge; died at Lisburne, Ireland, in 1667. He was educated at Perse's Free School in his native place; entered, in 1626, as a sizar in Caius College, where he graduated Master of Arts; and in 1636 obtained by the patronage of Archbishop Laud a fellowship of all Souls' College,

Jeremy Taylor.

Oxford. In 1638 he was presented by Bishop Juxon to the rectory of Uppingham, in Rutlandshire, and in 1642 he was appointed chaplain in ordinary to Charles I. After the outbreak of the civil war he continued to attend Charles as chaplain, and when the parliamentary party proved victorious he was fre

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quently imprisoned for short periods. Eventually he retired into Wales, where he was received by the Earl of Carbery, under whose protection he was allowed to exercise his ministry and keep a school. Afterwards he removed to London, but in 1658 he accepted an invitation from Lord Conway to reside at his seat in Ireland. Here he remained until the Restoration, when he was elevated to the Irish see of Down and Connor, with the administration of that of Dromore. He was also, in the same year, made a privy-councilor for Ireland, and chosen vice-chancellor of the University of Dublin. The greater part of his writings consist of sermons and devotional pieces, and upon the former rests his fame as a master of varied English prose.

Taylor, JOHN, usually called the *water-poet*, was born in Gloucester about 1580, and died in 1654. He served an apprenticeship to a waterman, was at the taking of Cadiz, under the Earl of Essex, in 1596, and was many years collector of the wine dues exacted by the lieutenant of the Tower of London. He afterwards kept a tavern, first at Oxford and then at Westminster. His pieces to the number of sixty-three were published in a folio volume in 1630, but he was the author of a great many more both in prose and verse. They are characterized by a certain rough vigor not free from vulgarity.

Taylor, PHILIP MEADOWS, born at Liverpool in 1808; died in 1876. From being a merchant's clerk in Bombay he entered the Nizam's army; received an appointment as administrator of the state of Shorapore; maintained order in the Berar district during the mutiny of 1857; and received the rank of colonel, a companionship of the Star of India, and a commissionership of the Western Deccan districts. He published the *Confessions of a Thug* (1839), *Tippoo Sultaun* (1840), *Tara* (1863), *Ralph Darnell* (1865), *Manual of the History of India* (1870), and *A Noble Queen* (1878).

Taylor, THOMAS, the 'Platonist,' born in London in 1758; died at Walworth in 1835. He studied with a view to the dissenting ministry, but entered a banking-house, when all his leisure was devoted to classical and philosophical studies. He published, chiefly with the aid of patrons, about forty different works, the most remarkable of which are *Plato* (five vols. 4to, 1804), printed at the expense of the Duke of Norfolk, who kept almost the whole edition locked up till 1848; and *Aristotle* (ten vols. 1806-12), printed at the expense of Mr. W. Meredith, who gave Taylor an annuity of £100, which he enjoyed till his death.

Taylor, TOM, born at Sunderland in 1817; died in 1880. He received his education at Glasgow University and Trinity College, Cambridge; became professor for two years in University College, London; was called to the bar (1845), and went on the northern circuit; appointed, in 1854, secretary to the Board of Health; wrote and adapted for the stage a great number of plays; and succeeded Shirley Brooks (1873) as editor of *Punch*. The most popular of his plays are: *New Men and Old Acres*, *Masks and Faces* (in collaboration with Charles Reade), *Still Waters Run Deep*, *The Overland Route*, and *The Ticket of Leave Man*. His historic dramas include: *The Fool's Revenge*, *Joan of Arc*, *'Twixt Axe and Crown*, *Lady Clancarty*, *Anne Boleyn*, etc. He also published biographies of B. R. Haydon (1853), C. R. Leslie (1859), and Sir Joshua Reynolds (1865).

Taylorville, a city, capital of Christian Co., Illinois, on the south fork of the Sangamon River, 28 miles s. w. of Decatur. Its manufactures include paper, chemicals, wagons, etc.

Taylor, WILLIAM, born at Norwich, England, in 1765; died in 1836. He was educated for a mercantile career, but after a lengthened stay in Germany he resolved to devote himself to literature. His published works are: a translation of Bürger's *Lenore* (1796) and Lessing's *Nathan the Wise* (1805), *English Synonyms Discriminated* (1813), and a *Historic Survey of German Poetry* (1828).

Taylor, ZACHARY, twelfth president of the United States, born in Orange county, Virginia, in 1784. He entered the army in 1808, and rose to the rank of major; took command of the United States forces at the outbreak of the Mexican war; repeatedly defeated the Mexicans, and finally triumphed over Santa Anna in the battle of Buena Vista (1847). This was the most spectacular battle of the war, Taylor winning the victory over much larger numbers, and it gave him a wide reputation, he becoming a popular favorite under his army title of 'Old Rough and Ready.' This popularity brought him the Whig party nomination for President in 1848 and he was elected in the following November. Though with little education and no political experience, he showed good sense and judgment, but died in the second year of his term, July 9, 1850.

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Tayra (tī'ra; *Galēra barbāra*), a carnivorous animal allied to the glutton, found in South America. In color it is black, save a large white patch on the breast.

Tchad (chăd), CHAD, or TSAD, a large fresh-water lake of Central Africa, in the Soudan, having the territories of Bornou, Kanem, and Bagirmi surrounding it; length, about 150 miles; breadth, about 100 miles; area, about 20,000 square miles, with a variable expanse according as it is the wet or dry season. Its principal feeder is the Shari from the south, and its shores are low and marshy. The lake (which has no outlet) swarms with turtles, fish, crocodiles, and hippopotami. It contains a number of small islands, which are densely peopled, as are also great part of its shores, especially on the west, where is the large town Kuka, capital of Bornou.

Tcherkask (cher'kask), or NOVO-TCHERKASK, a town situated on the Don, and capital of the Don Cossack country, Russia. The town is well built, and has a cathedral, college, library, market place, etc. Pop. 52,005.

Tcherkassy (cher-kas'sē), a town, government of Kieff, Russia, situated on the Dnieper, 190 miles southeast of Kieff. It is built of wood, and has a considerable trade. Pop. 29,620.

Tchernigov (cher-ne'gov), TCHERNIGOFF, or TCHERNIGOW, a government of Little Russia, situated on the left bank of the Dnieper; area, 20,232 sq. miles. The country is chiefly an undulating plain, fertile for the most part, and watered by the Soj, the Desna, and the Dnieper. Agriculture and cattle-breeding are the chief employments; corn, linseed, timber, tobacco, and sugar are exported. Pop. 2,322,007.—TCHERNIGOV, the capital, is situated on the Desna, about 80 miles N. N. E. of Kieff. It is the see of an archbishop, has a cathedral, a college, hospital, etc., and a considerable trade. Pop. 27,028.

Tchernozem (chern'ō-zem), the name for a black soil in Russia of extraordinary fertility, covering at least 100,000,000 acres, from the Carpathians to the Ural Mountains, to the depth of from 4 to 20 feet, and yielding an almost unlimited succession of similar crops without preparation.

Tcherny. See *Czerny*.

Tchudes (chū'dēs), a name applied by the Russians to the Finnic races in the northwest of Russia. It has now acquired a more general application, and is used to designate the group of peoples of which the Finns, the Esthonians, the Livonians, and Laplanders are members.

Tea (*Thea*), a genus of plants, nat. order Ternstrœmiaceæ (that to which the camellia belongs), comprising the species (*T. sinensis* or *chinensis*) which yields most of the tea of commerce. By different modes of culture this species has diverged into two distinct varieties, entitled *Thea viridis* and *Thea bohea*. The former is a large hardy evergreen plant with spreading branches and thin leaves from 3 to 5 inches long; the latter is a smaller plant, and differs from the other in several particulars. From both, according to the process of manufacture, black and green teas are procured. The tea plant is cultivated not only over a great part of China, but also in Japan, Tonquin, Cochin-China, Assam and other parts of India, and Ceylon. It has also been experimentally introduced into Carolina, Brazil, and Australia. Its growth is chiefly confined to hilly tracts; it is raised from seed, and the rearing of it requires great skill and attention. In seven years the plant attains the height of 6 feet, and the leaves are plucked off carefully one by one four times a year. In their green condition they are placed in a hot pan over a small furnace, and then rubbed lightly between the palms of the hands, or on a table. This process is repeated until the leaves become small, crisp, and curled. The black teas thus prepared include bohea, congou, souchong, and pekoe; the green teas, twankay, hyson-skin, young hyson, hyson, imperial, and gunpowder. Green tea gets less of the fire than black tea. The broken leaves, stalks, and refuse of the tea are compressed into solid bricks, which are imported by the Russians into the greater part of Central Asia, where (besides being used as a sort of coinage) they are sometimes stewed with milk, salt, and butter. There is considerable adulteration in the teas sent from China to the European market, and they are often artificially colored with a mixture of Prussian blue, or of gypsum and indigo carefully mixed. The infusion of tea-leaves in hot water yields a beverage which has little nutritive value, but it increases respiratory action, and seems to have a stimulative and restorative action on the nervous system. This is chiefly due to the essential oil and the theine (an alkaloid in its nature identical with the caffeine in coffee) which it contains, while the tannin, which is also present, acts as an astringent. If the

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water is boiling, an infusion of ten minutes is sufficient to extract all the theine, and a longer period only adds to the tannin in the beverage, a result which is very hurtful to digestion. From historical sources we learn that tea was used in China as a beverage in the sixth century, and two centuries after its use had become common. In England we first find it mentioned about 1615 by an agent of the East India Company; in 1660 Pepys says in his diary, 'I did send for a cup of tea, a China drink, of which I never had drunk before'; and in 1664 the East India Company made a present to the king of 2 lbs. 2 oz. In the year 1678 the import of tea to Britain was 5000 lbs., but forty years after it reached 1,000,000 lbs. and is now more than 250,000,000. China, until recent years, held almost a monopoly in the production of tea, but now India and Ceylon have entered the market as important competitors, and the product of Japan is large. Britain is the principal tea consuming country in the world, coffee being less in favor there than in many other countries, the United States and Canada for example. Tea is also very largely used in Russia and in great part of Asia. The tax laid on tea and the effort to force the colonists to use it, was one of the chief instigating causes of the American Revolution.

Teak (tēk; *Tectōna grandis*), a tree of the nat. order Verbenaceæ, a native of different parts of India, as well as of Burmah and of the islands from Ceylon to the Moluccas. It grows to an immense size, and is remarkable for its large leaves, which are from 12 to 24 inches long, and from 6 to 18 broad. The wood, though porous, is strong and durable; it is easily seasoned and shrinks but little, and from containing a resinous oil it resists the action of water, and repels the attacks of insects of all kinds. It is extensively used in shipbuilding and for many other purposes. —*African teak*, a timber similar to East Indian teak, is believed to be the produce of *Oldfieldia africana*, nat. order Euphorbiaceæ.

Teak (*Tectōna grandis*).

Teal (tēl), the common name for ducks of the genus *Querquedŭla*, the smallest and most beautiful of the Anatidæ, or duck family. The common teal (*Q. crecca*) is an annual visitor to Britain, remaining in parts of Scotland all the year. North American species include the green-winged teal (*Q. carolinensis*) which is very like the common teal, and the blue-winged teal (*Q. discors*), somewhat larger than the common teal, and easily domesticated.

Teasel (tē'sel), the English name of several plants of the genus *Dipsăcus*, nat. order Dipsaceæ, allied to the composite order. One species (*D. sylvestris*) grows wild in England, and in this country in hedges from Massachusetts to Indiana. Another species, the fuller's teasel (*D. fullōnum*), by some regarded as a mere variety, is cultivated for the sake of the awns of the head, which are employed to raise the nap of woolen cloths.

Tebeth (tē'beth), the tenth month of the Jewish ecclesiastical year, beginning with the new moon in December and ending with the new moon in January.

Technical Education. The term technical education, properly speaking, includes the field of all instruction relating to the arts, sciences, professions, and trades; but in common use it is restricted to the field of the industrial arts, and more particularly to that instruction in which theory rather than practice bears a preponderating part. The courses offered extend over four years and lead to the B.S. degree, one or two further years of study being required for professional degrees, viz., C.E. (civil engineer), E.E. (electrical engineer), etc. The courses which may generally be found are the following: engineering usually in all branches, chemistry, physics, architecture, mining and metallurgy. For the two last-named subjects special schools have been developed, especially in those states where mining is the chief industry, such as Colorado, New Mexico, Montana, and Michigan. In addition to lectures and laboratory practice, in most technical schools practical experience, under actual conditions, is demanded from students before proceeding to a degree.

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Technology (tek-nol'ō-ji), that branch of knowledge which deals with the various industrial arts. There are a number of schools of technology in the United States devoted to the study of civil, electrical, mining, and mechanical engineering and similar subjects. Among these are the Massachusetts Institute of Technology, at Boston, the Stevens Institute of Technology, at Hoboken, N. J., the Case School of Applied Science, at Cleveland, Ohio, the Towne Scientific School at the University of Pennsylvania, Sibley College at Cornell, the Armour Institute at Chicago, the Sheffield and Lawrence Scientific Schools, at Yale and Harvard respectively, the School of Mines at Columbia, etc.

Teck, ALEXANDER, PRINCE OF, was born in Kensington Palace, London, April 14, 1874, third son of the Duke of Teck and Princess Mary Adelaide. He served with honor at Matabeleland in 1896, and in South Africa, 1899–1900. On May 7, 1914, he was appointed Governor-General of Canada.

Tecoma (te-kō'ma), a genus of plants, nat. order *Bignoniaceæ*. The species are erect trees or shrubs or climbing plants, with usually pinnate leaves, and terminal panicles of dusky red or orange flowers. There are about 80 species, some of them as *T. impetiginosa*, medicinal.

Tectibranchiata (tek-ti-brank-i-ā'-ta), a division of gasteropodous mollusca, comprehending those species in which the gills are protected by a shell, or by the mantle, including the sea-hare and others.

Tecumseh (te-kum'seh), or Tecumtha, chief of the Shawnee Indians, born in 1768. After taking part in numerous battles he joined his brother Elskwatawa in 1805 in trying to organize the Western Indians against the whites. During his absence his brother attacked General Harrison and was defeated at Tippecanoe, November 7, 1811. This put an end to Tecumseh's plans and in the war that followed he joined the British. He was killed at the battle of the Thames, October 5, 1813.

Teddington (ted'ing-tun), a town of England, in the county of Middlesex, on the Thames, and about 13 miles S.W. of London. Pop. 17,840.

Te Deum (tē dē'um), a name (from the opening phrase, *Te Deum laudamus*) of the well-known Latin hymn usually ascribed to St. Ambrose and St. Augustine, although it cannot be traced farther back than the end of the fifth century. It is used in the ritual of Roman Catholic and Anglican churches.

Teel (tēl), TEEL-SEED, an Indian name for *Sesamum Indicum* and its seed. See *Sesamum*.

Tees (tēz), a river in England, which rises near Cross Fell, in Cumberland, and marks the southern limit of the county of Durham, to its mouth in the North Sea, where it forms an estuary. Its whole course is between 70 and 80 miles.

Teeth, the name given to certain hard structures growing out of the jaws of vertebrate animals, and serving as the instruments of mastication. The teeth of animals differ in shape, being destined for different offices. In man and the higher mammals two sets of teeth are developed, the early, milk, or deciduous teeth, and the permanent set. In fishes the teeth fall off and are renewed repeatedly in the course of their lives. Teeth do not belong to the skeleton, but to the skin or exoskeletal parts of the body, and are homologous with hairs. In man the teeth are imbedded in sockets in the upper and lower jawbones. There are thirty-two in all, sixteen in each jaw, and each consists of the crown or visible part, and the fangs or buried part. The four central teeth of each jaw having chisel-shaped crowns with sharp edges are called incisors; on each side of these four is the pointed canine tooth (which in the upper jaw is called the eye-tooth); on each side of these are two bicuspid teeth (præmolars); and behind these again are the molar teeth, three on each side. (See *Dental Formula.*) The last of the permanent teeth to appear are the farthest back, grinding teeth, which, owing to their arrival between the seventeenth and twenty-fifth years, are called the wisdom teeth. Each tooth has a central cavity filled with a soft pulp containing blood-vessels and nerves; this cavity is surrounded by dentine, a hard substance composed of phosphate and carbonate of lime; outside the fang is a cement-like substance resembling bone; while outside the crown is a hard enamel. In young teeth the enamel is covered by a delicate membrane called "the skin of the teeth," which in adult teeth is worn off. Toothache is due to decay of the substance of a tooth, dental caries as it is called. When the enamel which covers the tooth becomes flawed the underlying dentine is exposed and soon breaks down. When the decay, passing inward, reaches the pulp which contains the blood-vessels and nerves it causes inflammation, aching, and suppuration. Any treatment of toothache, short of extraction, is seldom satisfactory if the

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pulp has been actually attacked; but neuralgia is often mistaken for toothache. See *Dentistry*.

Teetotalism. See *Temperance. Societies.*

Teff (*Eragrostis Abyssinica*), a grain extensively cultivated in Abyssinia, having seeds about the size of those of millet.

Tegnér (teng-nār'), Esaias, a Swedish poet, born in 1782, studied at the University of Lund, became in 1812 professor of Greek literature, and in 1824 was appointed bishop of Wexiö, where he died in 1846. Among his works may be mentioned his *Frithiofs Saga*, an epic poem, repeatedly translated into English; his national song of the *Gotha Lion;* and *The Children of the Lord's Supper*, translated by Longfellow.

Tegucigalpa (tā-gö-sē-gäl'pä), the capital of Honduras, on the Rio Grande, about 3370 feet above the sea, surrounded by mountains, with a venerable old church, a high school, and an active trade. Pop. about 35,000.

Tegnexin (te-geks'in; *Teius Tegueaxin*), a species of lizard inhabiting tropical America. A full-grown specimen may exceed 5 feet in length, and they are able to swim with great ease and rapidity.

Teheran (te-her-ān'), capital of Persia, in Irak Ajemi, towards the northeast of the province, 66 miles south of the Caspian Sea, at the southern base of Mount Elburz. It is 4 miles in circuit, surrounded by a strong wall, flanked by numerous towers, with a broad dry ditch, and glacis. The city has six gates, from which the main streets lead to the bazaar in the center of the town. Since 1870 the city has been much improved, the streets being lighted with gas and laid with tramways. The principal edifice is the citadel-palace of the shah, which has considerable strength, but little architectural merit. During the summer months the court removes (on account of the intolerable heat) to more agreeable quarters on the heights to the north, and a third of the inhabitants (including the European embassies) follow the royal example. The principal manufactures are carpets, silks, cottons, and articles in iron. Pop. (in winter) 280,000.

Tehri (tā-rē'), a state of Hindustan. See *Garhwál*. Tehri is also a name for the state of Orchha (which see), and for its capital, an ill-built town with a pop. of 33,871.

Tehuacan (tā-wā-kān'), a town in the state of Puebla, Mexico, at the southern extremity of the highlands of Anahuac, on the right bank of the Salado, and 125 miles southeast of the city of Mexico. Pop. 7139.

Tehuantepec (tā-wān-tā-pek'), a town of Mexico, in the state of Oaxaca, 14 miles above the mouth of a river of the same name, falling into the Pacific Ocean. On account of a dangerous bar the river is little used for navigation. Pop., mostly Indians, 10,386. The town is near the south side of the Isthmus of Tehuantepec, the narrowest part of N. America, having the Gulf of Tehuantepec on the Pacific side, the Bay of Campeachy on the Atlantic side; width, about 115 miles. There have been various schemes for constructing a canal or a ship railway across the isthmus, the most recent of the latter sort being that of an American engineer named Eads. See *Ship Railway*. A railroad now crosses the Isthmus and a large and valuable trade has developed. It is expected to compete with the Panama Canal when finished, as furnishing a much shorter Atlantic-Pacific route from northern ports.

Teignmouth (tān'muth), a seaport and market-town of England, in the county of Devon, at the mouth of the Teign, which is here crossed by a wooden bridge 1671 feet in length. It is divided into East Teignmouth and West Teignmouth. East Teignmouth, which is the more modern, is almost entirely appropriated as a watering-place. West Teignmouth, the port and principal seat of business, has a safe and commodious harbor. The fisheries employ a considerable number of the inhabitants. Pop. (1911) 9221.

Teinds (tēnds), the Scotch law term for tenths or tithes of the fruits of the land. In the majority of instances the teinds now belong to the owners of the land formerly paying them, to the crown, or other proprietors, they being charged in all cases with the payment of the parish minister's stipend.

Telamon. See *Atlantes*.

Telautograph (tel-au'tō-graf), a writing telegraph, invented by Professor Elisha Gray, based on a novel system of transmission, whereby a fac simile reproduction of the handwriting of the sender of a message is effected. See *Telegraph*.

Teledu (tel'e-dö), a Javanese carnivorous quadruped, family Mustelidæ, allied to the skunk, and like it, when provoked, capable of diffusing a most abominable stench; the stinkard (*Mydaus meliceps*).

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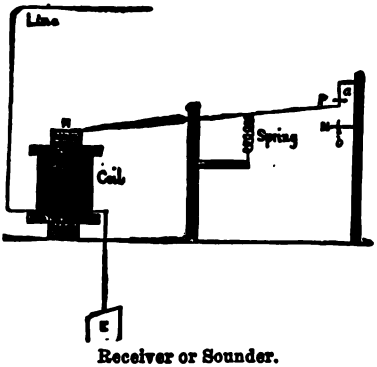
Telegraph (tel'e-graf), a general name for any instrument or apparatus for conveying intelligence beyond the limits of distance at which the voice is audible, the idea of speed being also implied. Thus the name used to be given to a semaphore or other appliances for signaling, which are now designated as *signaling apparatus*. The

Single-needle Instrument.

word *telegraph* has come to be restricted in its application to the electric telegraph, which from its power of rapidly conveying elaborate communications to the greatest distances has completely outrivaled all others. The electric telegraph, as comprising the entire system of apparatus for transmitting intelligence by electricity, consists essentially (1) of a battery or other source of electric power; (2) of a line-wire or conductor for conveying the electric current from one station to another; (3) of the apparatus for transmitting, interrupting, and if necessary reversing the current at pleasure; and (4) of the indicator or signaling instrument. The line-wires for overhead lines are usually of iron, protected from atmospheric influence by galvanizing or by being varnished with boiled linseed-oil, a coating of tar, or other means, and are supported upon posts, to which they are attached by insulators. (See *Insulator*.) In underground lines the wires are insulated by a gutta-percha or other non-conducting covering, and inclosed in iron or lead pipes. The battery and line-wire are common to all telegraphic systems; it is in the method of producing the signals that the great variation exists; but in all of them advantage has been taken of one or another of the three following properties of the current: (1) its power of producing the deflection of a magnetic needle, as in the galvanometer (which see); (2) its power of temporarily magnetizing soft iron; and (3) its power of producing chemical decomposition.

The *needle-telegraph* of Cooke and Wheatstone is an application of the first of these properties. This, the earliest form of telegraphic instrument, originally employed five needles, each worked by two wires. The number was subsequently reduced to two, and now only one wire is used. This hangs vertically, but can move to right or left between two stops. The signals are formed by combinations of the deflections in the two directions. These are variously combined to represent the letters of the alphabet, the Morse code being used. The needle-telegraph was never adopted out of England, and even here the Morse has been generally substituted for it.

The *electro-magnetic* instrument of Professor Morse is an application of the second of the above properties. By means of an electro-magnet, an armature which is attracted when the magnet is temporarily magnetized, a lever moved by the armature, and a style which moves with the lever, this instrument impresses a message in dots and dashes on a ribbon of moving paper, and by it forty words may be sent in a minute. This 'dot and dash' system which was invented by Morse is now in very general use. A modification of this instrument, called a *sounder*, in which the lever makes audible sounds by coming in con-



Receiver or Sounder.

tact with a brass rod, indicates the message by the length of the strokes produced. This is shown in the illustration, which shows the arrangement, by which the hammer-head H is attracted, and the arm H P is brought into contact with the pin *a*. Upon the cessation of the current the spring brings down the arm upon the pin *b*. Frequently the Morse

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is simultaneously a recorder and sounder. It being necessary that this instrument should produce sharp and distinct impressions, and the current being weak for stages over 50 miles, a relay, or subsidiary electro-magnetic circuit, is added to it in the case of longer distances. The transmitting instrument is a lever, which, on being pressed, permits the current from the battery to flow into the line-wire during the time the contact is made. Both on account of its intrinsic merits and for the sake of uniformity the Morse is the most extensively used system, being that in use in America and on the continent of Europe, and being also largely employed in Britain.

Hughes' *printing telegraph* is the instrument chiefly used by the submarine telegraph companies. It works with one line of wire, and has about three times the speed of the Morse system, with the advantage that the message is printed in the ordinary Roman type. The machine is rather complicated, but its principle can be easily understood. A wheel having type engraved on its rim is made to revolve at a known rate; a strip of paper, as in the case of the Morse, is drawn off a drum over a roller which lies under the rim of the revolving type-wheel; by means of the current the roller with the paper is raised against the type-wheel as the proper letter passes, and in this way the despatch is printed. The operator works on a keyboard much like that of a piano. Chemical telegraphs work on the principle that an iron wire pressing against a paper prepared with cyanide of potassium or other substance will, while a current is passing between the wire and the paper, produce a dark streak of Prussian blue or other mark, and when the current is interrupted the streak of pigment is interrupted. Bonelli's telegraph is worked by means of five wires. The message is set up in brass types in one line; the letters are common block letters; five styles, like the teeth of a comb, press against the raised portions of the type, and as the line of type is drawn through each style sends a current along its wire to a corresponding style pressing against prepared paper at the distant station, making a mark on the paper there corresponding to the raised portion of type which sends the current. The chief objection to Bonelli's telegraph is the five wires necessary between the stations. Autographic telegraphs are chemical telegraphs, and consist of a message written with a pen dipped in some non-conducting substance on a surface of tin-foil or other conducting material pasted on a cylinder which is made to revolve at a certain rate; a style presses against the surface, and is moved up or down the cylinder at a certain rate so as to describe a helical line; a current passes between the cylinder and style except when the non-conducting writing comes between them; at the distant station a similar cylinder covered with paper prepared with cyanide of potassium revolves at the same rate as the first cylinder; and its style being connected with the first style by means of the telegraph wire makes a mark of Prussian blue, which is a continuous helix, except when the current is interrupted at the first style. In this way a copy of the message in the handwriting of the sender is produced at a distant station. Bain's automatic telegraph is Bonelli's telegraph, wherein by adopting the Morse alphabet one wire is sufficient; and the type is simply a strip of paper with dots and dashes punched in it. In addition to the delicate *mirror* or *reflecting galvanometer*, which Sir W. Thomson invented in connection with the Atlantic telegraph, that distinguished electrician invented a self-recording instrument, consisting of a light coil of wire, very delicately suspended in a magnetic field, the motions of which coil, when a current is passed through it, are the means by which messages are recorded. The coil is attached to a very light glass siphon in the shape of an exceedingly fine capillary tube, through which ink from a reservoir is drawn by electric attraction. the reservoir and the moving paper ribbon upon which the ink falls being oppositely electrified. The extremity of the siphon is not in contact with, but only very near the paper. When there is no current the ink traces a straight line; when the current is passing the marks or deviations constituting the letters are produced. The delicacy and rapidity of this instrument are even greater than those of the mirror galvanometer, and the siphon recorder accordingly is highly valued.

As early as 1747 Bishop Watson showed that signals might be sent through a wire stretched across the Thames by discharging a Leyden-jar through it. In 1753 there appeared in the Scots Magazine a letter signed C. M., in which the idea of signaling by means of electric discharges is put forward. Lesage, 1774, erected at Geneva a telegraph line consisting of twenty-four wires connected with the same number of pith-ball electroscopes, each representing a letter. Reusser, in Germany, pro-

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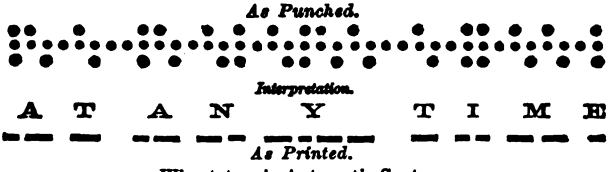
posed in the same year to replace the electroscopes by spangled panes exhibiting the letters themselves. Volta's discovery of the galvanic pile, and Oersted's discovery of electro-magnetism, by supplying electricity of a kind more easily retained on the conducting wires, afforded much greater facilities for transmitting signals to a distance. Ampère, in 1820, proposed to utilize Oersted's discovery by employing twenty-four needles to be deflected by currents sent through the same number of wires; and Baron Schilling exhibited in Russia, in 1832, a telegraph model in which the signals appear to have been given by the deflections of a single needle. Weber and Gauss carried out this plan in 1833 by leading two wires from the observatory of Göttingen to the Physical Cabinet, a distance of about 9000 feet. The signal consisted in small deflections of a bar-magnet suspended horizontally with a mirror attached, on the plan since adopted in Thomson's mirror galvanometer. At their request the subject was earnestly taken up by Professor Steinheil of Munich, whose inventions contributed more perhaps than those of any other single individual to render electric telegraphs commercially practicable. He was the first to ascertain that earth connections might be made to supersede the use of a return wire. He also invented a convenient telegraphic alphabet, in which, as in most of the codes since employed, the different letters of the alphabet are represented by different combinations of two elementary signals. His currents were magneto-electric, like those of Weber and Gauss. The attraction of an electro-magnet on a movable armature furnishes the means of signaling which is the foundation of Morse's telegraphic system, introduced in 1844, and notable for its convenient alphabet, now in use in all parts of the world. About the year 1837 electric telegraphs were first developed as commercial speculations in three different countries. Steinheil's system was experimented with at Munich, Morse's in America, and Wheatstone and Cooke's in England. The first telegraphs ever constructed for commercial use were laid down by Wheatstone and Cooke on the London and Birmingham and Great Western railways. The wires, which were buried in the earth, were five in number, each acting on a separate needle, but the expensiveness of this plan soon led to its being given up, the double-needle, and finally the single-needle, system replacing it.

This historical sketch may be completed by a statement of the more recent inventions of importance in telegraphic science. The first great improvement after the general introduction of the Morse system came in the *multiple* or *synchronous* system, which was first suggested as early as 1852. The early forms of this system proved unsatisfactory, but Delany's later invention, introduced about 1885, supplied a practical multiplex telegraph, by which several messages could be sent simultaneously. The principle involved is the synchronous rotation of sets of mechanism at opposite ends of a line. The difficulty to be met is that of maintaining perfect synchronism. This system differs in princi-



Wheatstone's Automatic System.

ple from that of *duplex telegraphy*, developed by a number of inventors, and now in general use in America and Europe. Edison's *quadruplex* system, introduced in 1884, is an improvement upon the duplex. In this two keys are provided in the sending circuit, and two relays, each having a coil in both the line-circuit and compensation-circuit. One key reverses the current, and the other brings into the circuit three times as much battery power, which permits of the two extra workings. A variety of other printing telegraphs have supplemented that of Hughes, including the Phelps and House machine, the Rogers, Gray's *telautograph*, and various others. In the Gray instrument two wires are used and written messages are reproduced. The writing instrument may be an ordinary pencil, the pen of the receiver being a glass tube, carrying its ink capillarily. The duplication of the motions of the pencil at the transmitter is performed by current impulses controlled by the shortening or lengthening of two silk cords to which the pencil is attached. By a complex mechanism the

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impulses at the transmitter are so duplicated at the receiver as to cause two aluminum arms to shift the receiving pen along positions similar to those assumed by the sending pencil and the silk cords, so that the record at the receiver is always a fac simile of that at the transmitter, whether words, figures, signs, or sketches are made. The transmission of drawings can be made by this and several other instruments.

In the *printing telegraph* of recent invention the message is prepared by a species of typewriting machine, which punches holes in a paper tape, which tape is fed automatically through a transmitter, having minute levers which make connections through the holes in the tape and send corresponding impulses over the wire. The speed of this instrument depends on the rapidity with which the typewriter can be worked, as the tape can be sent through the transmitter at almost any speed. Two hundred or more words a minute can be sent. Despite the rapidity of these methods, however, the simple Morse system still holds its own, all more rapid ones suffering from some degree of complication. An interesting development of telegraphy is that of sending messages from moving trains. This is done by induction from an instrument in the train to an external wire. The cost and little need of this system has prevented it from coming into use. For the most recent and one of the most interesting discoveries in telegraphy see *Wireless Telegraphy*.

Telegraph Cable. See *Submarine Cable*.

Telegraph-plant (*Desmodium gyrans*), an Indian leguminous plant, with small lateral leaflets, which display a strange spontaneous motion, especially in a warm, moist atmosphere. They jerk up and down as if signaling, as many as 180 times in a minute, and also rotate on their axes.

Telemachus (te-lem'a-kus), a son of Ulysses and Penelope, who is reputed to have gone through many adventures in search of his father after the close of the Trojan war. He is the hero of a French prose epic by Fénelon (1699).

Telemeter (tel-em'e-ter), a device for measuring distances; a distance-meter. The simplest forms consist of telescopes containing parallel wires accurately spaced, or there may be two telescopes at stations of known distance apart, the difference in the angles of observation affording a basis for calculating the distance of the object observed. This principle has been developed in the modern range-finder. Acoustic telemeters record the time between the flash of a gun and the hearing of the report.

Teleology (tel-e-ol'ō-ji), the science or doctrine of final causes; the doctrine which asserts that all things which exist were produced by an intelligent being for the end which they fulfill.

Teleosaurus (tel-e-ō-sa'rus), a genus of fossil crocodiles, occurring in the lower Jurassic rocks. They are found with marine fossils, and seem to have been especially fitted for an aquatic life.

Teleostei (tel-e-os'te-ī), a large and important sub-class of the class of fishes, distinguished primarily by the usually *bony* nature of the skeleton as compared with the cartilaginous skeletons of some other sub-classes. Almost all our common fishes are included in this order. See *Ichthyology*.

Telepathy (tel-ep'a-thi), thought transference from mind to mind through intermediate space. This word was coined about 1886 by the Society for Psychical Research to indicate the supposed cause of various phenomena observed. These were very numerous and varied, and sufficed to convince many members of the Society that such a power existed, they maintaining that the facts observed by them admitted of no other explanation. These facts consisted of drawings made by a sensitive when surrounded by others, who concentrated their thoughts on the object to be drawn; the successes far surpassing those likely to be due to chance. In addition were communications received mentally from a distance, occasionally a very great one, conveying some intelligence of a personal character that was afterwards corroborated. Many maintain that the phenomena known as spirit communications are telepathic in their origin, and to sustain this give a great expansion to the power of thought transmission.

Telephone (tel'e-fōn), an instrument for transmitting the human voice or other sounds by means of electricity and telegraph wires. About the year 1860 the idea that sound-producing vibrations could be transmitted through a wire by means of electricity began to be recognized by several men of science. Reis of Frankfort invented an apparatus which could reproduce at a distant station the pitch of a musical sound by means of a discontinuous current along a telegraph wire. A great step in advance was made in 1876, when Prof. Graham Bell discovered an articulating telephone which depends upon the

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OPERATING ROOM OF A TELEPHONE EXCHANGE

This is a typical branch in which the telephone business of 4,900 subscribers is handled swiftly and with remarkable accuracy.

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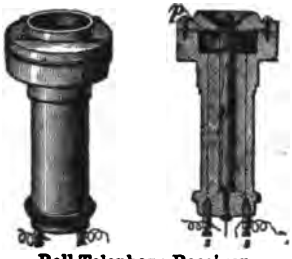
principle of the undulating current, and by means of which the very quality of a note, and therefore conversation itself, could be reproduced at a distant station. Elisha Gray had made a similar invention at the same time, and Bell and Gray applied for a patent on the same day, Feb. 14, 1876. Bell's application came first and the patent was granted him. The telephone was first shown in public at the Centennial Exposition of 1876, at Philadelphia. Several varieties of telephonic apparatus are now in use for inter-communication between distant places. The Bell telephone in its common form is shown in the accompanying cut. A strong ordinary bar-magnet *m* has round one of its ends a coil of fine silk-covered wire in metallic communication with the two terminals *s s*. One of the terminals communicates through a telegraph wire with one of the terminals of the coil of a precisely similar instrument at the other station, the remaining pair of terminals being connected



Bell Telephone Receiver.

through the earth, or through a return wire. Just in front of the extremity of the magnet there is a thin plate of iron *p*, and in front of this again there is the mouth-piece of a speaking-tube *o*. By this last the sounds to be transmitted are collected and concentrated, and falling on the metal plate cause it to vibrate. These vibrations in their turn excite undulating electric currents which correspond exactly with the vibrations; that is, with the original sounds. The electric currents being transmitted to the receiving telephone cause corresponding vibrations in the plate or disc in it, and these reproduce to the ear the original sounds. A telephone invented by Edison is based upon the variation of resistance to the electric current of carbon with variation of pressure. The microphone, in the invention of which both Edison and Berliver claim priority, is the basis of the carbon telephone. It has not come into use, the Bell principle being everywhere employed. The telephone is now an established institution throughout Europe and America. Copper wire is generally employed in the lines in preference to iron, on account of its superior power of electric conduction. Telephone exchanges exist in all the principal towns, subscribers to which have their houses or places of business in direct communication with each other. Long distance lines are also rapidly joining city to city, lines between New York and Chicago having been years in existence, while greater distances have been covered both in America and Europe. In the United States the telephone has made greater strides than in any other country. There is scarcely a village or small town but has its telephone exchange, while in the large cities there are many thousands in use. Throughout the country they may be found in many farm-houses and serve to reduce the isolation of the farmer's household. There are at present more than 22,000,000 miles of telephone wire in use in the United States and 37,000,000 in the world. See *Wireless Telephony*.

Telephote (tel'e-fōt), an instrument for telegraphing images of objects by the agency of electricity acting on selenium, the electrical resistance of which varies greatly with increase or diminution of light. It was invented in London in 1891.

Telescope, an optical instrument essentially consisting of a set of lenses fixed in a tube or a number of sliding tubes, by which distant objects are brought within the range of distinct, or more distinct vision. The law of action by which the telescope assists human vision is twofold, and that under all the varieties of its construction. A distant object viewed by the unaided eye is placed in the circumference of a large circle, having the eye for its center, and consequently the angle under which it is seen is measured by the minute portion of the circumference which it occupies. Now, when the distance is great, it is found that this angle is too small to convey to the retina any sensible impression — all the light proceeding from the object is too weak to affect the optic nerve. This limit to distinct vision results from the small aperture or pupil of the eye. The telescope substitutes its large object lens or reflector for the human eye, and consequently receives a quantity of light proportioned to its area or surface; hence a distant point, inappreciable by the eye alone, is rendered visible by the aid of the telescope. The rays of light, after transmission or reflection, converge to a point as they at

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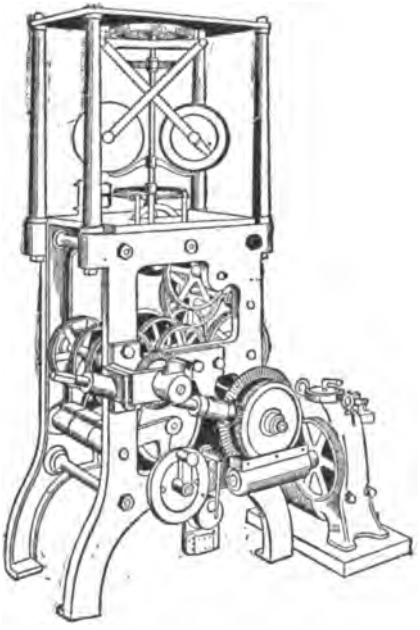
first proceeded from a point, and thus an image of the object is formed which, when viewed by the eye-piece or lens, is more or less magnified. The telescope therefore assists the eye in these two ways: it gathers up additional light, and it magnifies the object; that is to say, its image. The *refracting telescope* is constructed of lenses alone, which, by successive refractions, produce the desired effect. This instrument was formerly very cumbersome and inconvenient, inasmuch as its length had to be increased considerably with every accession of



Driving-clock of the 26-inch Equatorial Telescope of the U. S. Naval Observatory at Washington.

power; but the substitution of achromatic for ordinary lenses has rendered it more portable and convenient. The *reflecting telescope* is composed of specula or concave reflectors (see *Speculum*) aided by a refracting eye-piece. To this instrument we owe some of the most wondrous discoveries in astronomical science. The names of Newton, Gregory, Herschel, and Lord Rosse are connected with its history. The following diagrams exhibit the principles of construction and action in both sorts of telescopes. In fig. 1, which illustrates the refracting telescope in its simplest form, A and B are two lenses of different focal lengths. Rays of light from a distant object falling upon the object-glass A are converged to a focus at C. The eye-glass B, placed at its focal distance from the point of convergence, gathers up the diverging rays and carries them parallel to the eye, magnifying the image formed at C. (See *Optics.*) The magnifying power of the instrument is as A C : C B,

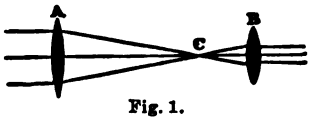


Fig. 1.

or as the focal length of one lens to that of the other. In this construction the object is seen inverted or turned upside down, and hence it is unsuitable for terrestrial purposes. To render the image erect, and thus show it in its natural position, a more complicated eye-piece, consisting of two additional lenses, is necessary. Another refracting telescope, consisting of two lenses in its simplest form, is called the Galilean telescope. It differs from the former in having a concave lens for its eye-glass, which lens is placed nearer the object-glass than the focus of this lens, producing an image which is not inverted. This kind of telescope is the one used in opera-glasses and field-glasses. Fig. 2 shows the structure

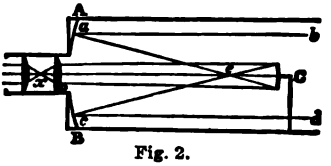


Fig. 2.

of the reflecting telescope as constructed by Dr. Gregory. A B is a large speculum perforated in the center; upon this fall the rays *b*, *a* and *d*, *c*, which are reflected to convergence at *e*. A smaller speculum, C, takes up the diverging rays and reflects them, slightly converging, through the aperture *o*, where they are received by a lens, and, after transmission, they intersect at *x*, and proceed to the eye-glass, whence they emerge parallel. The magnifying power of this instrument is great for its length. In the telescope invented by Sir William Herschel there is no second speculum, and no perforation in the center of the larger one placed at the bottom of the tube. The latter is fixed in an inclined position so that the image

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formed by reflection falls near the lower side of the tube at its open end or mouth, where it is viewed directly by an eye-piece, without greatly interfering with the light. This arrangement, in the case of large reflectors, is imposed by their great weight and difficult management. Were it otherwise the ordinary construction would be preferred, the inclination of the speculum being a disadvantage. Chromatic aberration, which arises from the different refrangibilities of the different colored rays, and leads to the formation, by a lens, of a separate image of a bright object for each colored ray, is remedied by achromatizing the lens, that is, by constructing it of two or more lenses of different kinds of glass, so that the colors, separated by one, shall be reunited by the others. (See *Achromatic.*) The most powerful refracting telescope yet made is that in the Yerkes Observatory, Wisconsin, which has an object-glass 40 inches in diameter. Next in size is the 36-inch telescope at the Lick Observatory, California. The Rosse telescope is the largest reflecting telescope, its lens being 6 feet in diameter. The Carnegie reflector, now making, will have a 100-inch lens.

Telescopium (te l-e-s k ō p'i-u m), a small southern constellation, was introduced by Louis de Lecaille in 1751 after extended observations. He placed the Telescopium between Ara and Sagittarius. The constellation is now obsolete.

Telescribe (tel'e-scrīb) or phonograph recorder, an instrument for recording telephone conversations, perfected by Thomas A. Edison in 1914. A phonograph record takes down every sound that comes over the wire, the recording apparatus being started or stopped by pressing a button. The chief use of the telescribe is in fixing exactly important business agreements by telephone; in case of dispute its decision will be final as to what was said by the persons concerned.

Telescriptor (tel-e-skrip'tor), a form of printing-telegraph with keyboard transmitter and an automatic receiver of the revolving type-wheel pattern. The operator strikes the keys exactly as if he were writing on a typewriter, and the words come out on a strip of paper that unrolls before him, while at the same time the message is being written before the eyes of the man at the other end of the line.

Telford, THOMAS, engineer, born in 1757 at Eskdale, Dumfriesshire; became a mason and worked at his trade in Edinburgh, which in 1782 he quitted for London. Here he was befriended by Sir William Pultney, through whom he was appointed surveyor of public works for Salop. He then exchanged his original occupation for that of civil engineer, and was intrusted with the construction of the Ellesmere Canal. In the years 1803 and 1804 the parliamentary commissioners for making roads and building bridges in the Highlands of Scotland, and also those for making the Caledonian Canal, appointed Telford their engineer, and thus an immense amount of work was carried out by him. Above thirty harbors were built or improved by him, some of which, as at Aberdeen and Dundee, were upon an extensive scale. He superintended the construction of a number of large bridges, and the execution of numerous important works for the metropolis. Besides the 900 miles of

Thomas Telford.

roads laid in Scotland he engineered a system of roads through the more inaccessible parts of Wales, which involved the erection of the magnificent suspension bridge across the Menai Straits, begun in 1820, and the Conway bridge, begun in 1822. He employed a system of road-making since known as the Telford. In 1806 he was employed by the Swedish government to lay out a system of inland navigation through the central parts of that kingdom. He died in 1834, and was interred in Westminster Abbey.

Tell. See *Algeria.*

Tell, WILLIAM, a famous peasant hero of Switzerland, reputed to have done some daring and wonderful feats in his resistance to the tyranny of the Austrian governor Gessler, but now proved to have been a mythical personage. He

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is said to have belonged to the canton of Uri, and to have united with others belonging to this canton and to those of Unterwalden and Schwyz in resisting the Austrians. In particular, having refused to do homage to Gessler's hat, set upon a pole, he was seized and condemned to death, but was granted his life on condition of shooting with an arrow an apple placed on the head of his own son. This he did successfully, admitting at the same time that a second arrow he had was intended for Gessler in case of failure. He was therefore still kept a prisoner; but while being conveyed over the Lake of Lucerne he managed to leap ashore, and soon after, having lain in wait for Gessler, he killed him.

Tell-el-Kebir (tel-e-ke-bēr'), a village of Egypt, where the British troops under Wolseley defeated those of Arabi Pasha, September 13, 1882.

Teller (tel'er), HENRY MOORE, statesman, was born at Granger, New York, in 1830; died in 1914. He was a lawyer in Illinois and Colorado and was a major-general of Colorado militia in the Civil War. In 1876 he was elected to the United States Senate; appointed secretary of the interior in 1882, and in 1885 and 1891 again elected senator. He withdrew from the Republican party in 1896 and was reëlected in 1897 as an Independent Free-silver Republican, and as a Democrat in 1903.

Tellicherry (tel-i-cher'i), a seaport of Hindustan, in the presidency of Madras, a healthy and picturesque town, built upon a group of wooded hills, with a citadel or castle in excellent preservation. It is a mart for sandalwood, coffee, etc.

Tellurium (tel-lūr'i-um), a metal first recognized as a distinct element in 1798. Symbol Te, atomic weight 127.5, specific gravity 6.27. It is a brittle, silvery-white element, melting at 452°C. and boiling at 478°C. Occasionally found native, but is very rare, and is mostly obtained in combination with other elements. It combines directly with hydrogen to produce telluretted hydrogen, a highly poisonous gas. There are two chlorides, the dichloride and the tetrachloride. Bromides and iodides are known. With oxygen it forms the dioxide and the trioxide, and a monoxide has been described. Two acids exist, tellurous acid and telluric acid. No well-defined normal salts in which tellurium acts as a metallic radical are known. Tellurium is found in Transylvania and other parts of Hungary, in the Altai silver mines and in North America.

Telpherage (tel'fer-ij), a system for the automatic transport of goods by means of electricity devised by Fleeming Jenkin in 1881. It consists of a line of steel rods or cables suspended from brackets or posts, 70 feet apart, and serving at once as a supporter of weights and a conductor of electricity. Buckets or other receptacles are hung from the line by a wheel or pair of wheels, and a small electrical motor, hanging below the line, supplies the power. Trains of buckets filled with goods may be conveyed at one time, or they may be carried forward in a continuous stream. The system was developed in conjunction with Professors Ayrton and Perry.

Telshi (tyel'shē), a town of Russia, in the government of Kovno, 150 miles N.W. of Vilna. It has a population of 7700.

Telugu (te-lū'gu), or TELINGA, one of the languages of India, belonging to the Dravidian group, and spoken in southern India by about twenty-one millions of people. The Telugu are the most numerous branch of the Dravidian race, but are less enterprising than the Tamils. The language is allied in roots to the Tamil language, but differs considerably otherwise.

Tembuland (tem'bŏ-land), a district of the Transkeian Territories in eastern South Africa, which are bounded by Cape Colony, Basutoland, and Natal. Tembuland has an excellent climate and a fertile soil, which is well suited for pastoral and agricultural purposes. The coast regions are adapted to the growth of sugar, cotton, and coffee. The minerals include coal and copper. Pop. 231,151.

Temesvar (tem'esh-vär), a town of Hungary, in the Temes Banat, on the river Bega and the Bega Canal, 75 miles N.N.E. of Belgrade. It is strongly fortified, and is for the most part well built, with spacious streets and squares. The principal buildings are the Greek Orthodox cathedral and other churches, the government offices, townhouse, theater, various schools and colleges, arsenal, civil and military hospitals. The manufactures consist of woolens, silks, paper, tobacco, etc. Held by the Turks from 1552 to 1716, Temesvar was retaken by Prince Eugene. Pop. 72,555.

Temnikov (tyem-nyi-kov'), a town in the Russian government of Tambov, on the Moksha. Pop. 5737.

Tempē (tem'pē), VALE OF, a beautiful valley of northern Greece, in Thessaly, on the Peneus, much celebrated

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by the ancient poets, having Mount Olympus on the north and Mount Ossa on the south.

Tempera. See *Distemper.*

Temperance Societies. The first association for the purpose of influencing public opinion in order to check the evil of intemperance was a society formed at Moreau, New York, in 1808. It was followed in 1813 by the Massachusetts Society for the Suppression of Intemperance. In 1826 a new impulse was given to the movement by the establishment in Boston on a more extensive plan of the American Society for the Promotion of Temperance, the first annual report of which announced the formation of thirty, and the second of 220 auxiliary associations. By 1831 more than 2200 societies, embracing 170,000 members, were in correspondence with the parent society. Reports of the movement in America soon began to have an effect on the other side of the Atlantic. In August, 1829, a society was formed in Ireland, and before a year had passed sixty organizations, with 3500 members, were in existence. In 1838 a great impetus to the movement was given by the Rev. Theobald Mathew, a Roman Catholic priest, who succeeded in less than two years in persuading 1,800,000 of his countrymen to renounce the use of ardent spirits. The first temperance society in Scotland was established at Maryhill, near Glasgow, in October, 1829, and the Greenock and Glasgow and West of Scotland Temperance societies were constituted soon afterwards. On the 14th of June, 1830, the first temperance society in England was founded at Bradford, and by the close of the year there were in existence some thirty associations, numbering about 10,000 members. These societies went no further than the resolve to abstain from ardent spirits, the use of fermented liquors in moderation being permitted. But the principle of total abstinence soon followed. In 1832 the war against intoxicating liquors of all kinds was opened in England by Joseph Livesey of Preston, and by 1838 the total abstinence, or teetotal, party had triumphed all along the line, the old temperate or moderation party having gradually disappeared. Of late years many of the advocates of total abstinence have sought to enforce their views by legislative measures, as exemplified in the celebrated Maine Liquor Law (for the suppression of the manufacture and sale of intoxicating beverages), so called from the state in which a prohibitory law was first enacted. Some other states passed similar laws, but at the end of the century only three maintained prohibition, Maine, Kansas, and North Dakota. In the early years of the twentieth century an active movement was instituted in favor of local option and state prohibition of liquor selling, beginning in the South, where negro drunkenness had become a serious evil, and extending to some of the states of the North. As a result, on January 1, 1911, complete prohibition existed in nine states, these being Maine, Kansas, North Dakota, Georgia, Alabama, Mississippi, North Carolina, Oklahoma, and Tennessee. Since that date active progress has been made in the temperance cause and nine more states have been added to the list. These include Arizona, Arkansas, Colorado, Idaho, Iowa, Oregon, Virginia, Washington and West Virginia. Among the important developments in the temperance movement are the organizations known as the Independent Order of Good Templars and the Anti-Saloon League. (See these titles.) The Woman's Christian Temperance Union, long under the presidency of Frances E. Willard, has been an influential Society.

Temperature (tem'per-a-tûr) may be expressed as the state of a body with regard to heat, or to its power of communicating heat to other bodies. It often refers to the atmospheric heat of a locality at a particular time. When we speak of a body having a 'high' or a 'low' temperature it is implied that the condition of heat in the body may be compared with the thermometer. See *Thermometer.*

Temperature of Animals. See *Animal.*

Tempering (tem'per-ing), in metallurgy, the process of giving to metals, principally iron and steel, the requisite degree of hardness or softness, especially the process of giving to steel the necessary hardness for cutting, stamping, and other purposes. If heated and suddenly cooled below a certain degree it becomes as soft as iron; if heated beyond that degree, it becomes very hard and brittle. The process essentially consists in plunging the steel when red-hot into cold water or other liquid to give an excess of hardness, and then gradually reheating it until the hardness is reduced or brought down to the required degree. The excellence of all steel-cutting instruments depends on the degree of temper given to them. Different degrees of temper are indicated by different colors which the steel assumes. Thus

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in different materials, and in the same material it varies with the state of the body in regard to temperature and other circumstances. The resistance offered to tearing is called *absolute tenacity*, that offered to crushing, *retroactive tenacity*. The tenacity of wood is much greater in the direction of the length of its fibers than in the transverse direction. With regard to metals the processes of forging and wire-drawing increase their tenacity in the longitudinal direction; and mixed metals have, in general, greater tenacity than those which are simple.

Tenail (te'nāl), TENAILLE, in fortification, an out-work or rampart raised in the main ditch immediately in front of the curtain, between two bastions, in its simplest form having two faces constituting a reëntering angle.

Tenant (ten'ant), in law, one who occupies, or has temporary possession of lands or tenements, the titles of which are in another, the landlord. A *tenant-at-will* is one who occupies lands or tenements for no fixed term other than the will of the landlord. A *tenant in common* is one who holds lands or tenements along with another or other persons. Each share in the estate is distinct in title, and on the death of a tenant his share goes to his heirs or executors. A *tenant for life* is one who has possession of a freehold estate or interest, the duration of which is determined by the life of the tenant or another. An estate for life is generally created by deed, but it may originate by the operation of law, as the widow's estate in dower, and the husband's estate by courtesy on the death of his wife. See *Landlord and Tenant*.

Tenant-right, a term specifically applied to an Irish custom, long prevalent in Ulster, either ensuring a permanence of tenure in the same occupant without liability to any other increase of rent than may be sanctioned by the general sentiments of the community, or entitling the tenant of a farm to receive purchase-money amounting to so many years' rent, on its being transferred to another tenant; the tenant having also a claim to the value of permanent improvements effected by him. In course of time the advantages of tenant-right granted to the Ulster farmers were claimed by the farmers in the other provinces of Ireland, and the custom spread to a considerable extent. At last, under the management of Gladstone and Bright, the Landlord and Tenant Act of 1870 was passed. By it the Ulster tenant-right and other corresponding customs received the force of law; and the outgoing tenant became entitled to compensation from the proprietor to an amount varying according to circumstances. The act contained other provisions giving compensation for improvements, but as it did not succeed in doing away with all grievances a fresh bill was prepared and passed under the name of the Land Law Act, 1881, which established a land commission to revise rents, and to fix them for fifteen years. This measure has been amended by subsequent acts. See *Ireland*.

Tenasserim (ten-as'er-im), a maritime division of Burmah, about 500 miles in length, and from 40 to 80 in breadth, with an area of 46,730 square miles. The eastern boundary of the district is formed by a range of mountains from 3000 to 5000 feet in height. The coast is for the most part rocky, and off the southern part of it the sea is studded by the innumerable islands, large and small, of the Mergui Archipelago. There are several good harbors, formed by the mouths of the rivers. Tenasserim is a hilly and densely wooded region, with here and there tracts of arable land. It passed into the hands of the British at the close of the first Burmese war in 1826. Pop. 1,159,558.

Tenby (ten'bi), a municipal borough and seaport of Wales, in the county of Pembroke, on the west side of Carmarthen Bay, on the point and north-east margin of a rocky peninsula. It has a fine old church and several other buildings of note, including the Welsh Memorial to the late Prince Consort, and carries on a considerable trade in fish and oysters. It is besides a bathing-place, celebrated for its fine sands, beautiful scenery, and agreeable climate. The old walls of the town are still to some extent preserved. Pop. 4362.

Tench, a teleostean fish, belonging to the carp family and genus *Tinca*, of which *T. vulgāris* (the common tench) is the type. It inhabits most of

Tench (*Tinca vulgāris*).

the lakes of the European continent, and attains a length of from 10 to 12 inches.

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The color is generally a greenish-olive above, a light tint predominating below. It is very sluggish, apparently inhabiting bottom-waters, and feeding on refuse vegetable matter. It is very tenacious of life, and may be conveyed alive in damp weeds for long distances. The flesh is somewhat coarse and insipid.

Tender (ten'der), in law, an offer of compensation or damages made in a money action. To make a tender valid the money must be actually produced. A tender made to one of several joint claimants is held as made to all. A tender of money for any payment is legal, and is called a *legal tender*, if made in current coin of the United States: in silver coins less than $1, not exceeding $10; in gold and silver coins, for any amount; in United States bank notes, except for duties on imports and interest on the public debt.

Tender (naval), a small vessel appointed to attend a larger one, and employed for her service in procuring stores, etc. In railways a tender is a carriage attached to the locomotive for carrying the fuel, water, etc.

Tendon (ten'dun), the name given to the 'sinews' by means of which muscles are inserted upon bones. They consist of bundles of white fibrous inelastic and very strong tissue disposed in bands, and separated by areolar or connective tissue.

Tendotome (ten'dō-tōm), in surgery, a subcutaneous knife, having a small oblanceolate blade on the end of a long stem, and used for severing deep-seated tendons without making a large incision or dissecting down to the spot.

Tendrac (ten'drak), in zoölogy, a small insectivorous mammal, from Madagascar. It is about two-thirds the size of the common hedgehog.

Tendril, in botany, a curling and twining thread-like process by which a plant clings to another body for the purpose of support. It may be a modification of the midrib, as in the pea; a prolongation of a leaf, as in Nepenthes; or a modification of the inflorescence, as in the vine. They have been divided into stem tendrils and leaf tendrils. Called also cirrhus, and by the old authors capreolus and clavicula.

Tenebrio (te-nē'bri-ō), a genus of beetles, the type of the family Tenebrionidæ. The larvæ of one species (*T. molitor*) are the destructive meal-worms which infest granaries, flour-stores, etc.

Tenedos (ten'ē-dos), an island of Asiatic Turkey, on the west coast of Asia Minor, 15 miles southwest of the Dardanelles, about 6 miles long and 3 miles broad. The channel which separates it from the mainland is 3 miles broad. The interior of the island is very fertile, and is remarkable for the excellence of its wines. Corn, cotton, and fruits are also produced. On the eastern side of the island, near the sea, is the town of Tenedos. Pop. about 4000. On it is the little seaport of Tenedos.

Teneriffe (ten-ėr-if'), Teneriffa, the largest of the Canary Islands (which see), is of an irregularly triangular form, and has an area of about 782 square miles. It is of volcanic formation, composed principally of enormous masses and cones of trachyte, lava, and basalt, which culminate in the Peak of Teneriffe, 12,182 feet high. The coast consists of an almost uninterrupted series of lofty cliffs, and the only good harbor is that of Santa Cruz, the capital, on the northeast. The most remarkable feature of the interior is the celebrated Peak, the summit of which forms a crater half a league in circuit, and from which is obtained one of the most magnificent views in the world. Two eruptions have taken place since the colonization of the island by the Spaniards in 1496, namely, in 1706 and 1798, and at all times the internal activity of the volcano is indicated by frequent streams of hot vapor. The principal productions are maize, wheat, potatoes, pulse, almonds, oranges, guavas, apples, honey, wax, silk, cochineal, and wine. Cochineal, tobacco, and wine are the chief exports. Pop. 138,008.

Tenesmus (te-nes'mus), in medicine, a continual inclination to void the contents of the bowels, accompanied by straining, but without any discharge. It is a common symptom in dysentery, stricture of the urethra, etc.

Teniers (ten'e-ėrz), David, the name of two celebrated artists of the Flemish school, father and son, both natives of Antwerp, in which city the elder was born in 1582. Having studied under Rubens, he spent six years in Rome. On his return he occupied himself principally in the delineation of fairs, rustic sports, and drinking parties, which he exhibited with such truth, humor, and originality, that he may be considered the founder of a style of painting which his son afterwards brought to perfection. His pictures are mostly small. He died in 1649.— His son was born in 1610, and was taught painting by his father, whom he excelled in correctness and finish. He became highly popular, was appointed court painter to the archduke Leopold

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William, governor of the Netherlands, and gave lessons in painting to Don John of Austria. He specially excelled in outdoor scenes, thoug many of his interiors are masterpieces of color and composition. His general subjects were fairs, markets, merry-makings, guard-rooms, taverns, etc., and his pictures, which number over 700, are found in all the important public and private galleries of Europe. His etchings are also highly esteemed. He died at Brussels in 1690.

Tenimber Islands. See *Timor Laut.*

Tennant (ten'ant), WILLIAM, a Scottish poet of some note, born at Anstruther, Fifeshire, in 1784, studied for some time at the University of St. Andrews, and becoming a good oriental linguist, was in 1835 appointed to the chair of oriental languages in St. Mary's College, St. Andrews, dying in 1854. His chief production is *Anster* (that is, Anstruther) *Fair*, a humorous poem of Scottish life in the same stanza as Byron's *Don Juan*, which it preceded, being published in 1812. Besides *Anster Fair*, Tennant was the author of several other poems and some dramas. None of them, however, attained any success. Grammars of the Syriac and Chaldee tongues were also published by him.

Tennent, SIR JAMES EMERSON, statesman and writer, was born at Belfast in 1794, and educated at Trinity College, Dublin. From 1845 to 1850 he was civil secretary to the government of Ceylon; in 1852 he was secretary to the Poor-law Board; and from 1852 to 1867 he held the post of secretary to the Board of Trade, on retiring from which he received a baronetcy. He was the author of several books of travel and other works, the most important being a valuable account of Ceylon (1859, two vols.). He died in 1869.

Tennessee (ten-es-sē'), a south-central State of the American Union, bounded on the north by Kentucky and Virginia, east by North Carolina, south by Georgia, Alabama, and Mississippi, and west by Arkansas and Missouri; area, 42,022 square miles. Tennessee is popularly divided into three sections. East Tennessee, an extensive valley, and agriculturally one of the most important sections of the State, stretches from the eastern boundary to the middle of the Cumberland table land, which has an average elevation of 2000 feet above the sea, and abounds in coal, iron, and other minerals. Middle Tennessee extends from the dividing line on the table land to the lower Tennessee River, and is a region of fertile terraces, including the great elliptical basin of nearly 5000 square miles, known as the 'Garden of Tennessee.' West Tennessee extends from the Tennessee River to the Mississippi, the bottom lands along the latter stream being a low, flat, alluvial plain, covered with forests and with many lakes and swamps. The Unaka Mountains, a section of the Great Smoky range of the Appalachian chain, run along the eastern frontier, and have an average elevation of 5000 feet above the sea. The Mississippi, with the Tennessee and the Cumberland, drains three-fourths of the State. The two latter are navigable for a considerable distance, and other rivers with numerous tributaries supply valuable water power. The climate is very healthy, the mean temperature of winter being 37.8°, and of summer 74.4°. West Tennessee is extremely fertile and produces corn and cotton abundantly. Middle Tennessee is generally fertile, also the valleys of the east. The principal grain crops are Indian corn, wheat and oats; and cotton, tobacco, hay and forage are extensively cultivated. The rearing and fattening of live stock are carried on under peculiar advantages, and immense numbers of hogs grow up on the mast of the forests, which cover a very large area. The wool clip is large and excellent and much attention is paid to fine breeds of horses. The most valuable minerals are coal and phosphate, which are very abundant, the coal deposits underlying 5100 square miles. Gold, silver, copper and zinc are also found, and there is a small output of iron ore and lime. Tennessee is rich in fine marbles, limestone, and other building stones. There is some output of clay, barytes and metallic paints, and considerable bauxite. Petroleum, sulphur, chalybeate and salt springs are plentiful. The lumbering interest is very great, and the lumber and timber industries lead all others. Other manufactures are flour and gristmill products, foundry and machine shop products, cars and general shop construction, oil, cottonseed and cake, etc. Besides the facilities for traffic afforded by the navigable streams, internal communication is further provided for by an extensive system of railways. Among the educational establishments stand the University of Tennessee at Knoxville, the University of Nashville, Vanderbilt and Fisk Universities, the last for colored students. The chief towns are Nashville (the capital), Memphis, Chattanooga, Knoxville. The first settlements in this State were made shortly before the Revolution, and in 1784 the settlers organized the State

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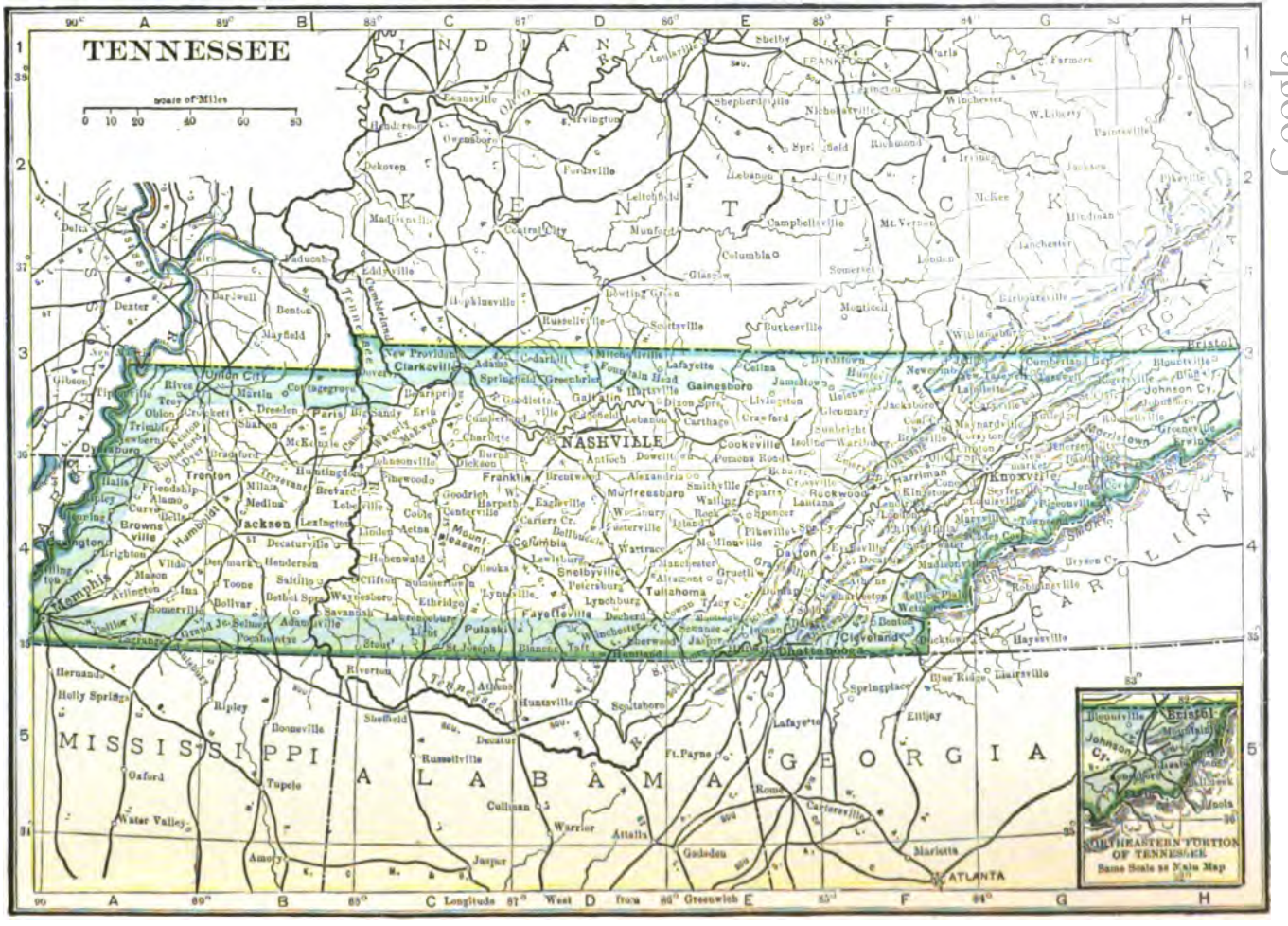

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of Franklin, which existed until 1788. In 1796 it was admitted to the Union as the State of Tennessee. It joined the Southern Confederacy in 1861, though a great majority of the inhabitants of East Tennessee were Unionists. Pop. (1910) 2,184,789.

Tennessee, a river formed by the union of two streams in the eastern part of the State of Tennessee, flows southwest, passes through the northern part of Alabama, then flows north through the western part of Tennessee and Kentucky, and enters the Ohio, of which it is the largest tributary, about 10 miles below the confluence of the Cumberland. Length, 1200 miles. A great dam was completed on the Tennessee River in 1913, and a power plant with 60,000 horsepower opened at Hale's Bar, a few miles from Chattanooga. The dam, which is 1200 feet in length, with an average height of 52 feet, holds up a lake 30 miles long, and lets pass a larger volume of water than passes over any other navigable river dam in the United States. The power house and lock are equally gigantic.

Tenniel (ten'yĕl), JOHN, a famous illustrator, was born at London in 1820. He was almost entirely self-taught, and his first picture was exhibited while he was little more than a boy. He painted one of the frescoes in the House of Parliament in 1845; in 1851 became connected as an illustrator with *Punch;* and he also illustrated many books, including *Æsop's Fables, Ingoldsby Legends, Alice's Adventures in Wonderland,* etc. He died in 1914.

Tennis (ten'is), a game in which a ball is driven continually against a wall in a specially constructed court, and caused to rebound beyond a line at a certain distance by several persons striking it alternately with a racket, the object being to keep the ball in motion as long as possible without allowing it to fall to the ground. The game was introduced into England in the thirteenth century, and continued to be very popular with the nobility to the reign of Charles II. The modern game of rackets is a descendant of tennis. (See *Rackets.*) *Lawn Tennis* is a recent modification of the game. See *Lawn Tennis.*

Tennyson (ten'i-sun), ALFRED, LORD, third son of George Clayton Tennyson, rector of Somersby, in Lincolnshire, was born at the same place, August 6, 1809. He received his early education from his father, attended Louth Grammar School, and in due course proceeded to Trinity College, Cambridge, where in 1829 he won the chancellor's medal by a poem in blank verse entitled *Timbuctoo.* As early as 1827 he had published, in conjunction with his brother Charles, *Poems by Two Brothers,* but his literary career may be said to date from 1830, when he published a volume entitled *Poems, chiefly Lyrical.* It was not received with any great favor by the public, although it was recognized by many to contain much that distinguishes the true poet. Its success at least was sufficient to encourage the poet to prepare a second collection, which appeared in 1833, and contained such poems as *A Dream of Fair Women, The Palace of Art, Œnone, The Lady of Shalott,* and others. At this time he sustained a great loss in the death of his friend Arthur Hallam, and this, with the severe criticism which his last volume received in *Blackwood's Magazine* and the *Quarterly Review,* may have occasioned his long silence. It was not till 1842 that he again appealed to the public with a selection of his poems in two volumes, and it is from this time that we find his work beginning to receive wide recognition. The collection then issued included *Morte d'Arthur, Locksley Hall, The May Queen,* and *The Two Voices,* all of which, it was almost at once acknowledged, entitled him to rank very high among modern poets. His reputation was more than sustained by the works that immediately followed. These were: *The Princess, a Medley* (1847); *In Memoriam* (1850), written in memory of his friend Arthur Hallam; and the *Ode on the Death of the Duke of Wellington* (1852). The latter was his first great poem after receiving the laureateship (1850) upon the death of Wordsworth. After that date hardly a year passed without his adding some gem to our language. *Maud and other Poems* was published in 1855, *Idylls of the King* followed in 1858; *Enoch Arden and other Poems,* in 1864; *The Holy Grail and other Poems,* in 1869; *The Window, or the Songs of the Wrens,* in 1870; and *Gareth and Lynette,* in 1872, the latter volume, which included the *Last Tournament,* completing the series of poems known as the *Idylls of the King.* In 1855 the University of Oxford conferred on Tennyson the honorary degree of D. C.L., and in 1869 the fellows of Trinity College, Cambridge, elected him an honorary fellow. So long ago as 1833 he had had printed for private circulation a poem entitled *The Lover's Tale;* in 1879 this was republished, together with a sequel entitled *The Golden Supper.* In the following year appeared *Ballads*

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and other Poems. Among his later compositions are the dramas, *Queen Mary* (1875), *Harold* (1876), and *The Cup.* The latter was successfully produced by Mr. Irving at the Lyceum Theatre in 1881, as had also been *Queen Mary. The Falcon*, another drama, was produced by Mr. and Mrs. Kendal in 1882, and *The Promise of May* was brought out at the Globe Theatre the same year. *The Cup* and *The Falcon* were published as a single volume in 1884, and in the same year appeared the historical drama of *Becket.* In 1885 appeared *Tiresias and other Poems;* in 1886 *Locksley Hall: Sixty Years After*, which also included *The Promise of May;* and in 1889 *Demeter and other Poems*, this last volume containing work of as high a quality as any of his previous writings. Tennyson was raised to the peerage in 1884 as Baron Tennyson of Aldworth, Sussex, and Freshwater, Isle of Wight. Few writers have developed so rare a mastery of English as a poetic instrument, and his works have a high rank in the literature of the nineteenth century. He died October 6, 1892.—His brother CHARLES (born 1808; died 1879) assumed the name of *Turner* by royal license on succeeding to property at the death of his grandmother. He published, in conjunction with his brother, *Poems by Two Brothers* (Louth, 1827), now a great bibliographical rarity. He became vicar of Grasby, Lincolnshire, in 1835, and published *Sonnets* (1864), *Small Tableaux* (1868), and *Sonnets, Lyrics, and Translations* (1873).

Tenor (ten'ur; in Italian, *tenore*), in music, is the more delicate of the two adult male voices, and its compass generally extends from C in the bass to G or A in the treble. The qualities of the tenor render it suitable to the expression of tender and delicate sentiments. In a vocal composition of four parts, for mixed voices, the tenor forms the second middle part, deeper than the alto, but higher than the bass; but in a song of the four male voices the tenor, as the first voice, leads the chief melody, and as the second is the higher middle voice. The clef of this voice is the C clef, placed upon the fourth line of the staff, as here shown.

Tenpins, a common game in the United States adapted from the older English game of ninepins. The pins (round pieces of wood) are set upright in triangular form at the end of a long level platform, and are bowled down by round bowls of varied size rolled down the length of the platform, the game being counted by the number of pins that are caused to fall.

Tenrec. See *Tanrec.*

Tent, a portable dwelling-place, formed usually in the simplest manner, of canvas, for instance, stretched with cords upon poles. Tents are much used for private purposes and everywhere for army shelter. The soldiers' tents in the United States army have ridged tops, while those of the British army are circular, supported by a vertical pole in the center 10 feet high.

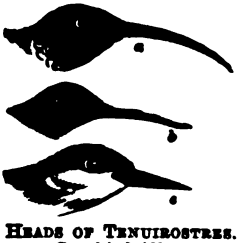
Tentacle (ten'ta-kl), in zoölogy, an elongated appendage proceeding from the head or cephalic extremity of many of the lower animals, and used as an instrument of exploration and prehension. Thus the arms of the sea-anemone, the prehensile processes of the cirripeds and annelids, the cephalic feet of the cephalopods, the barbs of fishes, are termed *tentacles.*

Tentaculites (ten-tak'ū-lits), a genus of fossil shells, found abundantly in Siberian and Devonian strata. Some writers regard them as tubicular annelids, while others refer them to the pteropods.

Tenthre'do. See *Saw-flies.*

Ten'tyra, or TENTYRIS. See *Dendorah.*

Tenuirostres (ten-ū-i-ros'trēz; slender-beaked), one of the four sections into which the order Insessores of birds is divided. This group, represented by the humming-birds, creepers, sunbirds, hoopoes, etc., is characterized by the generally elongated bill, which usually tapers to a point.



HEADS OF TENUIROSTRES. *a*, Sun-bird (*Nectarinia afra*). *b*, Humming-bird (*Trochilus recurvirostris*). *c*, European Nuthatch (*Sitta Europea*).

Tenures. See *Land, Tenure of.*

Teocallis (tē-u-kal'is; 'houses of God'), the name given to the ancient temples of Mexico, of which there are extensive remains. They were generally solid four-sided truncated pyramids, built terrace-wise, with the temple proper on the platform at the summit. They were constructed of earth, faced with brick, and many still remain in a more or less perfect state. The principal existing specimens are those

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of Cholula, near Mexico, and of Palenque, in Yucatan. See *Cholula* and *Palenque*.

Teos (tē'os), or TEIOS, anciently a town on the coast of Ionia, in Asia Minor, opposite Samos, the birthplace of the poet Anacreon.

Tepic (tā-pēk'), a town of Mexico, in the state of Jalisco, pleasantly situated and rendered peculiarly attractive by terraced gardens and shady promenades. It has manufactures of woolens and sugar, and mines in the neighborhood. Pop. 15,488.

Teplitz (tāp'litz), or TÖPLITZ, a town of Northern Bohemia, pleasantly situated in a valley between the Erzgebirge and Mittelgebirge, with a castle and fine park and gardens. It has celebrated thermal baths. The springs, seventeen in number, have a temperature varying from 99°.5 to 108°.5 and are efficacious in cases of gout and rheumatism. The bathing establishment is very complete, and during June and July the whole town is filled with visitors. Pop. 24,420.

Terai. See *Tarai* and *Himálaya*.

Teramo (tā'ra-mō), a town of Southern Italy, capital of the province of same name, in an angle formed by the confluence of the Tordino and Vezzola. It is the see of a bishop, and has an old, though modernized, cathedral and remains of Roman baths and theater. Pop. 10,508.

Teraphim (ter'a-fim), household deities or images, reverenced by the ancient Hebrews. They seem to have been either wholly or in part of human form and of small size, were regarded as *penates* or household gods, and in some shape or other used as domestic oracles. They are mentioned several times in the Old Testament.

Teratology (ter-a-tol'ō-ji), the division of physiological and anatomical science devoted to the investigation of abnormalities in the structure of animals and plants, and to the determination of the exact nature of the deviation from a normal type of structure.

Terbium (ter'bi-um), was the name given to a supposed earth-metal now found to be nearly identical with erbium, and which has been resolved into several elements.

Terburg (ter'burg), or TERBORCH, GERARD, a Dutch portrait and genre painter, born at Zwolle, near Overyssel, about 1617. His father, a historical painter, gave him his first lessons in painting. He continued his studies at Haarlem, and afterwards visited Germany, Italy, Spain, England, and France. On the meeting of the peace congress at Münster in 1646 he painted the assembled plenipotentiaries, which is now in the National Gallery, London. He subsequently visited Madrid, London, and Paris, whence he returned to Overyssel, married, and became burgomaster of Deventer, dying in 1681. His portraits and pictures of social life are remarkable for elegance. He excelled in painting textile fabrics, particularly satin and velvet.

Terce (ters), is a legal life-rent amounting to one-third of her deceased husband's landed estates recognized by the law of Scotland in favor of a widow who has not accepted of any special provision.

Terceira (ter-sā'ē-rà), an island of the Atlantic, one of the Azores; greatest length, 20 miles; average breadth, 13 miles; area, 223 square miles. The soil possesses great natural fertility, and heavy crops of grain, pulse, etc., and abundance of oranges, lemons, and other fruits are produced. The capital is Angra. Pop. 48,770.

Terebinth (ter'e-binth), the common name for various resinous exudations, both of a fluid and solid nature, such as turpentine, frankincense and Burgundy pitch, Canada balsam, etc. The volatile oil of various of these resins is called oil of terebinth, or oil of turpentine. Terebinth is also a name for the turpentine-tree (which see).

Terebratula (ter-ē-brat'ū-la), a genus of deep-sea brachiopod bivalve molluscs found moored to rocks, shells, etc. One of the valves is perforated to permit the passage of a fleshy peduncle, by means of which the animal attaches itself. There are few living species, but the fossil ones are numerous, and are found most abundantly in the secondary and tertiary formations.

Teredo (te-rē'dō). See *Ship-worm*.

Terek (tyā'rek), a Russian river which descends from Mount Kasbek, on the north side of the Caucasus, and flows into the Caspian by a number of branches; total course, about 300 miles.

Terence (ter'ens), in full PUBLIUS TERENTIUS AFER (that is, 'the African'), a celebrated Roman comic writer, born in Africa, B.C. 195, and while a child bought by Publius Terentius Lucanus, a Roman senator, who took him to Rome and gave him a good education. His master having emancipated him, the young African assumed the name of his benefactor, and

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Terrestrial Magnetism. See *Magnetism.*

Terrier (ter'i-er), the name originally given to any variety of dog that dug or burrowed in the ground in pursuit of its quarry. Its present use is restricted to small or moderately small dogs of a number of breeds. The type of the class is the fox terrier (*q. v.*). Terriers vary in size from the toy black and tan, and Yorkshire, very small breeds, to the Airedale (*q. v.*), the largest and heaviest of the class. The bull terrier, as its name implies, is a cross between the bulldog and the smooth-coated white terrier of early time. It is a quick, agile and powerful dog, of unfailing courage, and has been much used by the sporting fraternity as a pit dog, that is, a dog used for fighting when matched against one of its own breed. The Boston terrier is an American breed, originated about 1870. It arose from breeding a brindle three-quarter English bulldog which had one-quarter terrier, and a pure white terrier of stocky build and low on the legs. A further breeding and selection of this type as developed by the above cross, resulted in the standard Boston terrier, whose characteristics are a screw tail, a white blaze on the face and on chest and feet, a fine short and bright coat, and a deep, broad chest. It is a good tempered, courageous dog. There are many other breeds of terriers, as the Scotch, the Skye, the Bedlington, the Welsh and the Irish (*q. v.*), a very popular breed.

Territory (ter'i-tor-i), a section of the national domain not yet admitted to statehood. It has a governor, appointed by the President, with a legislature of certain limited powers. At present there are two—Alaska and Hawaii.

Terror (ter'er), REIGN OF, the term usually applied to the period of the French revolutionary government from the appointment of the revolutionary tribunal and the committee of public safety (April 6, 1793) to the fall of Robespierre (July 27, 1794). See *France* (*History*).

Terry (ter'ri), ALFRED HOWE, soldier, born at Hartford, Connecticut, in 1827. He engaged in the Civil war as a colonel of volunteers; became a brigadier-general in 1862. He commanded a division in the army under Grant in the summer of 1864; became a major-general in the regular army, retiring in 1888. He died Dec. 16, 1890.

Terry, ELLEN ALICE, actress, born at Coventry, England, in 1848. She appeared on the stage in a child's part in 1856, and continued acting until 1864, when she married and left the stage. She returned in 1867, and in 1888 appeared at the Lyceum Theater with Henry Irving, with whom she afterwards remained, making several tours in the United States. Among her best parts are *Portia*, *Pauline*, and *Ophelia*, she playing the last to Irving's *Hamlet*.

Terschelling (ter-skel'ing), an island of the Netherlands, 10 miles off the coast of Friesland, between the islands of Vlieland and Ameland. It is about 15 miles long by 3 broad, is flat and sandy, and exposed in some parts to inundation. The inhabitants are chiefly pilots and fishermen. Pop. 3685.

Tertian Fever. See *Ague.*

Tertiary Formation. See *Geology.*

Tertullian (ter-tul'yan), in full QUINTUS SEPTIMIUS FLORENS TERTULLIANUS, the earliest Latin father of the church whose works are extant, flourished chiefly during the reigns of Septimius Severus and Caracalla (A. D. 193–217), became a presbyter, and continued orthodox till he had reached middle age, when he went over to the Montanists (see *Montanus*), and wrote several books in their defense. His most celebrated work is the *Apologia*, a formal defense of Christianity addressed to the Roman magistrates. Among other works whose period is not known is *Adversus Hermogenem*, in which Tertullian maintains the doctrine of the creation of the world out of nothing as opposed to the eternity of matter *per se*. The works of Tertullian display great learning, much imagination, and a keen wit, but their style is bad. They are chiefly valuable for the light they throw on the doctrine and discipline of the church in the age in which he lived.

Tesho-lama. See *Lamaism.*

Tesla (tes'la), NIKOLA, born at Smiljau, Servia, in 1857. Becoming a skilled electrician, he came to the United States in 1884 and in 1885 entered the Edison works at Menlo Park, New Jersey. He subsequently set up an establishment of his own in New York. He has made important inventions in lighting and other uses of electricity. His most valuable device is his oscillator, a combination of dynamo and engine.

Tessellated Pavement, a pavement of rich mosaic work, made of squares of marbles, bricks, or tiles, in shape and

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disposition resembling dice, and known as *tesseræ*.

Tesserograph (tes'ser-ō-grâf). the name applied to a machine for printing railway tickets as needed, invented by Robert Piscicelli Taeggi, an Italian engineer. One of these machines first in use in Italy printed any one of 400 different kinds of tickets at a cost of about one five-hundredths of a cent each.

Test Acts, include all statutes which require persons holding public offices to profess certain religious beliefs. In England, from the time of the Reformation onwards, a large number of such acts were passed in favor of the Established Church. The various test acts were for the most part repealed in 1829.

Testament. See *Will.*

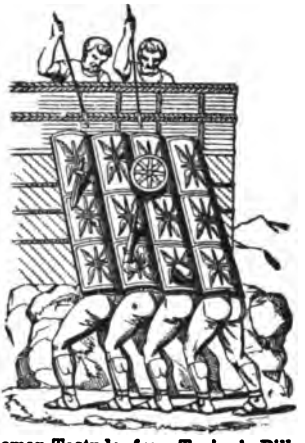
Testing (test'ing), the process of examining various substances by means of chemical reagents, with the view of discovering their composition. The term testing is usually confined to such examinations as seek to determine what chemical elements or groups of elements are contained in any substance, without inquiring as to the quantity of these elements. Testing is carried out either by the application of chemical reactions to solid substances, or by the application of reagents in solution to a solution of the substance under examination.

Test-papers, slips of unsized paper soaked in solutions of vegetable coloring matters, used as indicators of the presence of acids or of alkalies, and, in some instances, of special chemical compounds. The most common test-papers are litmus and turmeric papers.

Testudo (tes'tū-dō). See *Tortoise.*

Testudo, among the ancient Romans a cover or screen which a body of troops formed with their oblong shields or targets, by holding them over their heads when standing close to each other. This cover somewhat resembled the back of a tortoise, and served to shelter the men from missiles thrown from above. The name was also given to a structure movable on wheels or rollers for protecting sappers.

Tetanus (tet'a-nus), a spasmodic rigidity of the whole body, such as frequently results from wounds. The affection occurs more often in warm climates than in cold. If the lower jaw is drawn to the upper with such force that they cannot be separated the disorder is called *lock-jaw* (*trismus*). Tetanus frequently terminates fatally.



Roman Testudo, from Trajan's Pillar.

Tête-du-pont (tāt-dū-poṇ), in fortification, a work that defends the head or entrance of a bridge nearest the enemy.

Tetrabranchiata (te-tra-brank-i-ā'-ta), an order of Cephalopoda or cuttle-fishes, having four branchiæ or gills, comprising the two families Nautilidæ and Ammonitidæ. Of this order the pearly nautilus may be regarded as the type, being the only living member of the order, though its fossil representatives (Orthoceras, Ammonites, etc.) are abundant. See *Nautilus.*

Tetrahedron (-hē'dron), in geometry, a figure comprehended under four equilateral and equal triangles, or a triangular pyramid having four equal and equilateral faces. It is one of the five regular solids.

Tetra'o. See *Grouse.*

Tetrarch (tet'rârk), a title which originally signified the governor of the fourth part of a country. By the Romans the title was used to designate a tributary ruler inferior in dignity to a king.

Tetrastyle (tet'rā-stīl), in ancient architecture, having or consisting of four columns, or having a portico consisting of four columns.

Tetuan (tet-ō-ăn'), a town of Morocco, on the northern coast of Africa, 33 miles southeast of Tangier. It is about ½ mile from the Mediterranean, is surrounded by walls and defended by a castle, and carries on an active trade. The environs are extensively

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planted with vineyards and gardens. Pop. 25,000.

Tetzel (tet'zel), JOHANN, a man whose name has become prominent in connection with the Reformation, was born about 1470, at Leipzig, where he studied theology. He entered the order of the Dominicans, and in 1502 was appointed by the Roman see a preacher of indulgences, and carried on for fifteen years a successful propaganda of them. It was his preaching in Saxony of the indulgence in behalf of the rebuilding of St. Peter's in Rome that roused Luther to revolt. Though many of the sayings attributed to him by his critics are fictitious, yet there is little doubt that he often indulged in frivolity and went farther in his promises than the teaching of his church authorized him to go. The best Roman Catholic historians condemn him for exaggeration. Tetzel died of the plague in 1519, in the Dominican convent at Leipzig. See *Luther.*

Teuthis. See *Squid.*

Teutoburg Forest (toi-to-bŏrg'), or TEUTOBURGER WALD, a hilly district of Germany, in Westphalia, where Arminius defeated the Roman general Varus, A.D. 9. See *Arminius.*

Teutones (tū'tun-ēz), a tribe of Germany, which, with the Cimbri, invaded Gaul in B.C. 113. In B.C. 102 they were defeated with great slaughter near Aquæ Sextiæ (Aix in the department of Bouches du Rhône) by the Roman general Marius. A tribe of the same name is mentioned by Pliny and others as inhabiting a district north of the Elbe, which appears to have been the original settlement of the Teutones before their invasion of Gaul. See *Teutonic Peoples.*

Teutonic Knights (tū-ton'ik nīts), a military religious order of knights, established toward the close of the twelfth century, in imitation of the Templars and Hospitallers. It was composed chiefly of Teutons or Germans who marched to the Holy Land in the Crusades, and was established in that country for charitable purposes. In the thirteenth century they acquired Poland and Prussia, and they long held sway over a great extent of territory in this part of Europe. The order began to decline in the fifteenth century, and was finally abolished by Napoleon in 1809.

Teutonic Peoples, a term now applied (1) to the High Germans, including the German inhabitants of Upper and Middle Germany and those of Switzerland and Austria. (2) The Low Germans, including the Frisians, the Plattdeutsch, the Dutch, the Flemings and the English descended from the Saxons, Angles, etc., who settled in Britain. (3) The Scandinavians, including the Norwegians, Swedes, Danes and Icelanders. See *Philology, Indo-European Languages.*

Tewfik Pasha (tū'fik pa-shą'), MAHOMMED, Khedive of Egypt, eldest son of Khedive Ismail, was born in 1852, and succeeded to the viceroyalty by decree of the sultan, August 8, 1879, upon the forced abdication of his father. He was the sixth ruler of Egypt in the dynasty of Mahommed Ali Pasha. He died January 7, 1892. See *Egypt.*

Tewkesbury (tūks'be-ri), a market-town and municipal borough of England, in Gloucestershire, at the conflux of the Severn and Avon. The parish church is a noble pile of building in the Norman style, and one of the largest in England. It is part of the monastery of Tewkesbury. Pop. (1911) 5287.

Texarkana (teks-ar-kan'a), a town of Bowie Co., Texas, adjacent to a town of the same name, capital of Miller Co., Arkansas. The two towns form a single municipality. It has car and engine works, cotton-seed oil mills, manufactures of lumber, furniture, etc. Pop. of Texarkana, Texas, 9790; of Texarkana, Arkansas, 5655.

Texas (teks'as), the most southwesterly of the Gulf States of the American Union, is bounded N. by New Mexico, Oklahoma, and Arkansas, E. by Oklahoma, Arkansas and Louisiana, W. by New Mexico, S. W. by Mexico, and S. E. by the Gulf of Mexico; extreme length, east to west, 825 miles; breadth, 740 miles; coast-line, 400 miles; area, 265,896 sq. miles. The surface in the northwest bears many mountains, which, in proceeding southeast, subside into hills and undulating plains, succeeded, on approaching the Gulf of Mexico, by low alluvial lands. These extend inland from 20 to 80 miles, are traversed by numerous rivers, and consist for the most part of rich prairie or forest land. The hilly region behind this is formed chiefly of sandstone and limestone ridges, separated by valleys of considerable fertility. The general slope of the country gives all the rivers a more or less southerly direction. The Rio-Grand, rising in New Mexico, forms the southwest boundary of the State. The Red River forms the greater part of the northern boundry. The other important rivers are the Colorado, the Brazos, the

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Trinity, and the Sabine, which, during the greater part of its course, is the boundary between Texas and Louisiana. The great timber region of the state lies between the Sabine and the Trinity a region generally level and sandy in the south, with extensive pine forests, but rolling and fertile in the north. Between the Trinity and the Colorado prairie land extends, timbered along the streams, but in the north there is an extensive forest, extending through Central and Western Texas to the Red River and called the 'Cross Timbers.' The timber area embraces about 42,000,000 acres, 25,000,000 being in pines. The pecan tree, a valuable nut-bearing tree, is widely distributed and yields largely. Western Texas is chiefly prairie. A long chain of lagoons stretches along the Gulf of Mexico. The soil of Texas is, on the whole, extremely fertile. The staple products are cotton and maize, both of which are largely cultivated. In the lower or coast region, the sugar-cane and rice also grow luxuriantly. Wheat grows chiefly in the north and center. Rye, oats, barley, tobacco and sweet and white potatoes are grown to some extent, and both in the elevated and the lower levels fruits in almost endless variety are abundant. Texas leads the states in cotton production, yielding one-fifth of the world's crop. Sea-island cotton is grown in the south. Thousands of acres are under irrigation from flowing artesian wells, mainly in the southwest. The pastures are often covered with the richest grasses, and the rearing of cattle, sheep and swine is carried on very advantageously. The minerals include copper, of which there are large deposits; argentiferous galena, which is also abundant; coal, including a field of lignite about 6000 sq. miles in area; iron, occurring in very large quantities; asphaltum, which occurs abundantly; salt, obtained from rich salt springs; petroleum, of recent discovery and now very largely produced; saltpeter, marble, slate, potter and fire-clay, and fertilizers in great abundance. The manufactures of Texas, which increased 300 per cent. in the period from 1890 to 1910, depend largely for their raw materials upon the stock-raising, agricultural and mineral products of the state, and have been greatly stimulated by the rapid increase in the production of these materials. Galveston, an important commercial center in the state, is one of the largest ports of entry in the South, and Sabine is also a port of growing prominence. These avenues of transportation afford excellent opportunities for interstate, domestic, coastwise and foreign commerce. The first permanent settlement in Texas was made at San Antonio by the Spanish in 1718. After Mexico won its independence Texas became one of the Mexican states. Several colonies of American citizens, invited by the Mexicans, settled in the eastern section, and gradually increased in numbers. Texas then revolted from the Mexican government, and in 1836 declared itself independent. Santa Anna attempted to reduce it, but failed, being himself beaten and taken prisoner at the battle of San Jacinto by General Houston. Texas now managed its own affairs as an independent republic till 1845, when it became one of the United States, and thus gave rise to a war which proved disastrous to Mexico. It joined the Confederates during the Civil War, and was the last state to submit. It was under military control till 1870, when it was restored to the Union. Austin is the capital, and other chief towns are Galveston, San Antonio, Houston, Dallas, Fort Worth, Waco, etc. Its growth has been rapid. Pop. 3,896,542.

Texel (teks'el), an island of the province of North Holland, 14 miles in length and 6 in its greatest breadth, situated at the entrance of the Zuyder Zee, and separated from North Holland by the narrow channel of Mars-Diep. The island furnishes excellent pasture for sheep, and it is noted for cheese made from sheep's milk. It is well secured with dikes of prodigious strength and height. Pop. 5954.

Tezcoco (tes-kō'kō), or TEXCOCO, a town of Mexico, in the department of Mexico, on the eastern shore of the Lake of Tezcoco. In ancient times it was the second city in the kingdom. Here are the remains of three pyramids, each measuring 400 feet along the base of their fronts. The modern town contains many handsome edifices, and carries on an active trade. Pop. 5930.

Tezel (tet'sl). Same as *Tetzel*.

Thackeray (thak'e-ri), WILLIAM MAKEPEACE, an English novelist and humorist, was born at Calcutta in 1811; died December 24, 1863. His father was in the civil service of the East India Company. At the age of seven Thackeray was sent to England for his education, and was placed at the Charterhouse School, London, afterwards continuing his studies at Cambridge. He left the university without taking a degree; and, being well provided for, he chose the profession of an artist. He spent several years in France, Germany and Italy, staying at Weimar, Rome

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and Paris, but gradually became convinced that art was not his vocation, and having meanwhile lost his fortune, he resolved to turn his attention to literature. His first appearance in this sphere was as a journalist. Under the name of George Fitz-Boodle, Esq., or of Michael Angelo Titmarsh, he contributed to *Frazer's Magazine* tales, criticisms, verses, etc., which were marked by great knowledge of the world, keen irony, or playful humor. It was in this magazine that *The Great Hoggarty Diamond*, *Yellowplush Papers*, and *Barry Lyndon* appeared. In 1840 he published separately the *Paris Sketch-book*, in 1841 the *Second Funeral of Napoleon* and the *Chronicle of the Drum*, and in 1843 the *Irish*

William Makepeace Thackeray.

Sketch-book. None of these writings, however, attained to any great popularity. In 1841 *Punch* was started, and his contributions to that periodical, among others *Jeames' Diary*, and the *Snob Papers*, were very successful. In 1846-48 his novel of *Vanity Fair* was published in monthly parts, with illustrations by himself; and long before its completion its author was unanimously placed in the first rank of British novelists. His next novel was the *History of Pendennis*, completed in 1850. In 1851 he delivered a course of lectures in London on the *English Humorists of the Eighteenth Century*, which was repeated in Scotland and America, and published in 1853. Another novel, *The History of Henry Esmond* appeared in 1852, and was followed by *The Newcomes* (1855), *The Virginians* (1859), a sort of sequel to *Esmond; Lovel the Widower*, *The Adventures of Philip*, and *Denis Duval*, which was left unfinished at his death. In 1855-56 he delivered a series of lectures in the United States — *The Four Georges*, and afterwards in England and Scotland. In 1859 he became editor of the *Cornhill Magazine*, in which his later novels and the remarkable *Roundabout Papers* appeared, but he retired from that post in 1862. He wrote a good deal of verse, half-humorous, half-pathetic, and often wholly extravagant, but all characterized by grace and spontaneity. He undoubtedly ranks as the classical English humorist and satirist of the Victorian reign, and one of the greatest novelists, essayists, and critics in the literature. A collection of letters by Thackeray was published in 1887.— His daughter, ANNE ISABELLA (Mrs. Richmond Ritchie), born in 1838, inherited much of her father's literary talent. Her first story appeared in Cornhill in 1860, and was called *Little Scholars in the London Schools*. It was followed by the *Story of Elizabeth* in 1867. *Old Kensington*, which followed soon after, is probably the work by which she will be best known. Among her other works are *Blue Beard's Keys*, *Toilers and Spinsters*, *Miss Angel* and *Mrs. Dymond*.

Thais (thā'is), an Athenian courtesan, famous for wit and beauty, who was in Asia with Alexander the Great, and is said — on doubtful authority — to have induced him to burn the palace of Persepolis.

Thalamiflorae (thal-a-mi-flō'rē), a class of exogenous or dicotyledonous plants in which the petals are distinct and inserted with the stamens on the thalamus or receptacle.

Thalberg (tăl'berh), SIGISMUND, a celebrated pianist, was born in Geneva in 1812, received his first instruction on the pianoforte in Vienna, and already as a boy was famous as a performer. Towards the end of 1835 he went to Paris, where he at once established his fame. He subsequently visited England, the Netherlands, Russia and Italy, being everywhere received with the greatest enthusiasm. During the years from 1865 to 1868 he visited Brazil and the United States, and after several years' retirement on an estate he had purchased near Naples, he once more visited Paris and London (1862), and later Brazil. He died April 28, 1871. He left a number of compositions, including sonatas, studies, a concerto, several nocturnes, and other small pieces.

Thaler (tä'lèr), a silver coin formerly in use in Germany, of the value of about 75 cents. See *Dollar*.

Thales (thā'lēz), a native of Miletus in Ionia, or, according to some, of Phœnicia, the earliest philosopher of Greece, and the founder of the Ionian

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school, was born about 640 B.C. He is said to have made several visits to Egypt, where he received instructions from the priests, from whom he probably acquired a knowledge of geometry. After his return his reputation for learning and wisdom became so great that he was reckoned among the seven wise men, and his sayings were held in the highest esteem by the ancients. He died about B.C. 548. His philosophical doctrines were taught orally, and preserved only by oral tradition, until some of the later Greek philosophers, particularly Aristotle, committed them to writing. He considered water, or rather fluidity, the elemental principle of all things. His philosophical doctrines are, however, but imperfectly understood.

Thalia (tha-lī'a), one of the nine Muses. She was the patron of comedy, and is usually represented with the comic mask and the shepherd's crook in her hand. One of the Graces was also called Thalia.

Thallium (thal'i-um; from Gr. *thallos*, a green twig), a metal discovered by Crookes in 1861, in a deposit from a sulphuric acid manufactory in the Harz. In its physical properties thallium resembles lead, but is slightly heavier, somewhat softer, and may be scratched by the finger-nail. It fuses under a red heat, and is soluble in the ordinary mineral acids. In color it resembles silver, but is less brilliantly white. Its specific gravity varies from 11.8 to 11.9, according to the mechanical treatment to which it has been subjected. The tenacity of the metal is less than that of lead; it is possessed of very considerable malleability. Thallium and its salts impart an intense green color to a non-luminous flame; when a flame so colored is examined by the spectroscope one very brilliant green band is noticed, somewhat more refrangible than the sodium line D. (See *Spectrum*.) The salts of thallium are exceedingly poisonous. The symbol adopted for this metal is Tl, and the atomic weight 203.64. With oxygen it forms two compounds, Tl_2O, Tl_2O_3. Small quantities of thallium appear to be widely distributed in nature, the metal frequently occurring in iron and copper pyrites, in native sulphur, etc.

Thallogens (thal'o-jens), one of the primary divisions of the vegetable kingdom, comprehending those cryptogamous plants which are extremely simple in their structure, and possess nothing like the green leaves of phanerogamous plants. They have no woody fiber properly so called, being mere masses of cells. Thallogens include algæ, characeæ, fungi, and lichens.

Thallus (thal'us), in botany, a solid mass of cells, or cellular tissue without woody fiber, consisting of one or more layers, usually in the form of a flat stratum or expansion, or in the form of a lobe, leaf, or frond, and forming the substance of the thallogens.

Thallus of *Fucus Vesiculosus*. *t*, *t*, Fructification. *v*, *v*, Air bladders.

Thames (temz), the most important river of Great Britain, is usually said to rise about three miles southwest of Cirencester in Gloucestershire, near a bridge over the Thames and Severn Canal, called Thameshead Bridge, but is more properly formed by the Isis, Churn, Colne and Leach, which have their sources on the east side of the Cotswold Hills, and unite near Lechlade, where it becomes navigable for barges. Thence it flows E., past Oxford and Abingdon to Reading, after which its course is mostly E., with great bendings and windings, to its output in the North Sea, passing through London in its course. Below London it flows eastward to the Nore, a broad estuary, its mouth being about 60 miles below the capital. Its total course is estimated at 250 miles. It pursues a winding way through London, with an average width of about 1000 feet. The Basin of the Thames has an area of 5400 square miles, and belongs entirely to the upper part of the Secondary and to the Tertiary formations. The depth of the river in the fair way above Greenwich to London Bridge is 12 to 13 feet, while its tides have a mean range of 17 feet and an extreme rise of 22 feet. (See also *London*.) By means of numerous canals immediate access is given from its basin to those of all the great rivers of England.

Thana (tā'nā), TANNA, chief town of a district of the same name, Bombay Presidency 21 miles N. E. of Bombay city. It is a favorite residence with the Bombay officials. Pop. 16,011.

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Thane (thān), a title of honor among the Anglo-Saxons. In England a freeman not noble was raised to the rank of a thane by acquiring a certain portion of land — five hides for a lesser thane — by making three sea-voyages, or by receiving holy orders. Every thane had the right of voting in the witenagemot, not only of the shire, but also of the kingdom, when important questions were to be discussed. With the growth of the kingly power the importance of the king's thanes (those in the personal service of the sovereign) rose above that of the highest gentry, ealdormen and bishops forming an inferior class. On the cessation of his actual personal service about the king the thane received a grant of land. After the Norman conquest thanes and barons were classed together. In the reign of Henry II the title fell into disuse. In Scotland the thanes were a class of non-military tenants of the crown, and the title was in use till the end of the fifteenth century.

Thanet (than'et), Isle of, a district of England in the county of Kent, at the mouth of the Thames, separated from the mainland by the river Stour on the south and the rivulet Nethergong on the west, with an area of 41 sq. miles.

Thanksgiving Day, an annual festival of thanksgiving for the mercies of the closing year, originating in New England in 1621, after the first harvest at the Plymouth settlement. It slowly spread to the other colonies, and since 1863, when President Lincoln issued a proclamation recommending its national observance, his example has been followed by succeeding presidents, the last Thursday of November being chosen as Thanksgiving Day and kept as a holiday throughout the Union.

Thann (tan), Germany, in Alsace, has a fine Gothic church with a spire of open work 328 feet high, and has manufactures of woolens, cottons, etc. Pop. 7901.

Thar and Parkar (tur, pär'kur), a district in the east of Sind, British India. It is divided into two districts, the 'Pat' or plain of the Eastern Nara, and the 'Thar' or desert. Area, 12,729 sq. miles. Chief town, Umarkot or Amarkote, the birthplace of Akbar. Pop. 4924.

Thaso (thä'sō), the ancient *Thasos*, an island in the Ægean Sea, a few miles south of the Macedonian coast, belonging to Turkey.

Thaxter (thaks'ter), Celia, an American poet, born in New Hampshire, in 1835; died in 1894. She resided for years on the Isle of Shoals, and wrote *Among the Isles of Shoals*, *Drift Wood*, *Poems for Children*, etc.

Thayer (thā'ér), Abbott Henderson, American figure painter, born in Boston in 1849. He was a pupil of Gérôme at the Paris Ecole des Beaux Arts. Among his best-known works may be mentioned *The Virgin*, *The Virgin Enthroned* and *Caritas*.

Theatines (thē'a-tīns), an order of monks founded at Rome in 1524, principally by Gianpietro Caraffa (Pope Paul IV), archbishop of Chieti, in Naples (anciently *Theate*). They bound themselves to preach against heretics, attend the sick and criminals, and not to possess property or ask for alms. The order formerly flourished in France, Spain, and Portugal, but is now chiefly confined to the Italian provinces.

Theater (thē'a-ter; Greek, *theatron*), an edifice appropriated to the representation of dramatic spectacles. Among the Greeks and Romans theaters were the chief public edifices next to the temples, and in point of magnitude they surpassed the most spacious of the temples, having in some instances accommodation for as many as from 10,000 to 40,000 spectators. The Greek and Roman theaters very closely resembled each other in their general form and principal parts. The building was of a semicircular form, resembling the half of an amphitheater, and was not covered by a roof. In Greece the semicircular area was often scooped out in the side of a hill, but Roman theaters were built on the level. The seats of the spectators were all concentric, being arranged in tiers up the semicircular slope. The stage or place for the players was in front of the seats, being a narrow platform along the straight side of the theater. Behind this rose a high wall resembling the façade of

Theater of Segesta, Sicily — restored.

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a building, this being intended to represent any building in front of which the action was supposed to take place. This was called in Greek *skēnē* (L. *scena*), the stage being called *proskēnion* (L. *proscenium*). The semicircular space between the stage and the lowest seats of the spectators was called *orchestra*, and was appropriated by the Greeks to the chorus and musicians, and by the Romans to the senators. Scenery, in the modern sense of the word, was not employed except in a very rude form, but the stage machinery seems in many cases to have been elaborate; and in particular there was a well-known machine or contrivance of some sort from which deities made their entrance as if from the sky. A good existing example of an ancient theater is that of Segesta in Sicily.

Between the decline of the ancient and the rise of the modern drama there is a long interval, in which the nearest approach to theatrical entertainments is found in miracle plays, mysteries, and interludes. These performances took place in churches, convents, halls, etc., or in the open air. In 1548 the Confraternity of the Trinity opened a theater in Paris, in which they performed secular pieces. The first theater erected in Italy seems to have been that of Florence, built in 1581, but the first building that approaches the modern style was one constructed at Parma in 1618. In England there were organized companies of actors as far back as the time of Edward IV, but as there were no regular playhouses the performances took place in tennis-courts, inn-yards, and private houses. The London Theater was built before 1576, and the Curtain in Shoreditch and the playhouses in Blackfriars and Whitefriars date from about the same time. Shakespeare's plays were brought out at the house in Blackfriars and at the Globe on the Bankside, both of which belonged to the same company, to whom James I granted a patent in 1603. The Globe was a six-sided wooden structure, partly open at the top and partly thatched. Movable scenery was first used on the public stage by Davenant in 1662, and about the same time this manager introduced women to play female characters, hitherto taken by boys and men. Modern theaters are all very much alike in their internal construction. The house is divided into two distinct portions, the auditorium and the stage, the former for the spectators, the latter for the actors and scenery, which is often of the most elaborate and realistic kind. The floor of the auditorium is always sloped down from the back of the house to the stage; several tiers of galleries or balconies run in a semicircular or horseshoe form round the house. The seats in the galleries rise terracewise from the front, so as to allow the persons in the back rows to see on to the stage over the heads of those before them. Immediately in front of the stage is a space occupied by the orchestra. Part of the stage flooring is movable, either as traps through which actors or furniture ascend or descend, or in long narrow pieces which are drawn off at each side of the stage to allow the passage of the rising scenes. Within recent years there have been great improvements in the art of stage setting, for the production of naturalistic effects, and the stage of to-day presents an extraordinary advance over that of the past centuries.

Thebes (thēbz), an ancient capital of Egypt, in Upper Egypt, on both sides of the Nile, about 300 miles S. S. E. of Cairo, now represented by the four villages of Luxor, Karnak, Medinet Habu and Kurneh, as well as by magnificent ruins which extend about 9 miles along the river. When Thebes was founded is not known; the period of its greatest prosperity reaches from 1500 to 1000 B.C. The ruins comprise magnificent temples, rock-cut tombs, obelisks decorated with beautiful sculptures, long avenues of sphinxes, and colossal statues. The largest of the temples is that at Karnak, which is about 1½ mile in circumference. The great hall of the temple (or 'hall of columns'; see *Egypt*, section *Architecture*), the most magnificent in Egypt, measures 329 feet by 170, and the roof was originally supported by 134 gigantic columns, of which 12 forming the central avenue are 62 feet high and 11 feet 6 inches in diameter, the others, which are in rows on either side, being fully 42 feet in height and 28 in circumference. Within the temple courts are several obelisks of red granite; one — the largest obelisk known — is 108 feet 10 inches high and 8 feet square. Above Karnak are the village and temple of Luxor, the latter at one time connected with Karnak by an avenue of sphinxes (some of which still remain) about a mile long. The Memnonium or temple of Rameses II, and the temple and palace of Rameses III, on the other or left bank of the river, are objects of great interest, both for the grandeur of their architecture and the richness and variety of their sculptures. (For plan of former see *Egypt*.) Here are also the colossal statues of Amenoph III, one of them known as the vocal statue of Memnon (which see). In the interior of the mountains which rise behind are found

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the tombs of the kings of Thebes, excavated in the rock, the most remarkable being that of Sethi I, discovered by Belzoni, and containing fine sculptures and paintings.

Thebes, a city of ancient Greece, the principal city of Bœotia, the birthplace of Pindar, Epaminondas, and Pelopidas, was situated about midway between the Corinthian Gulf and the Eubœan Sea. Cadmus is said to have founded it in 1500 B.C. It lost much of its influence in Greece through its perfidious leagues with the Persians. Under the brilliant leadership of Epaminondas and Pelopidas it became the leading state in Greece, but its supremacy departed when the former fell at the battle of Mantinea (B.C. 302). From this time the city never recovered its former importance, and gradually disappeared from history. The modern Thebes or Thiva is an unimportant town of some 3000 inhabitants.

Theca (thē'ka), in botany, the sporecase of ferns, mosses, etc.

Theft. See *Larceny*.

Theine (thē'in). See *Caffeine*.

Theism (thē'izm), the belief or acknowledgment of the existence of God, as opposed to *Atheism*. See *Deism*.

Theiss (tis), a river of Hungary, formed in the east of the kingdom by the junction of the Black and the White Theiss, both descending from the Carpathians and flowing into the Danube about 20 miles above Belgrade; length, about 800 miles. It is the second river in Hungary, being inferior only to the Danube, with which, for about 100 miles, the lower part of its course is almost parallel. Its principal tributary is the Maros from the east.

Themis (them'-is), goddess of law and justice among the Greeks, was the daughter of Urănus and Gē (Heaven and Earth); according to some, of Helios, or the Sun.

Themistocles (the-mis'tu-klēz), an Athenian commander, born in 514 B.C. On the second invasion of Greece by Xerxes, Themistocles succeeded by bribery in obtaining the command of the Athenian fleet, and in the battle of Salamis which followed (B.C. 480), the Persian fleet was almost totally destroyed, and Greece was saved. The chief glory of the victory is due to Themistocles. Subsequently he was accused of having enriched himself by unjust means, and of being privy to designs for the betrayal of Greece to the Persians. Fearing the vengeance of his countrymen, he, after many vicissitudes, took refuge at the Persian court. The Persian throne was then (465 B.C.) occupied by Artaxerxes Longimănus, to whom Themistocles procured access, and whose favor he gained by his address and talents, so that he was treated with the greatest distinction. He died in 449, according to some accounts by his own hand.

Themistocles.

Theobald (thē'u-bald; often pronounced tib'ald), Lewis, an English writer, born about 1690, was brought up to the profession of the law, but early turned his attention to literature, and wrote some plays, now quite forgotten. Pope was meanly jealous of him, and ridiculed him in his *Dunciad*. Theobald, however, had his revenge, his edition of Shakespere (1733) completely supplanting Pope's. He did great service to literature by this painstaking work, many of his emendations having been adopted by subsequent editors. He died in 1744.

Theobroma (thē-o-brō'ma). See *Cacao*.

Theocracy (thē-ok'ra-si), that government of which the chief is, or is believed to be, God himself, the priests being the promulgators and expounders of the divine commands. The most notable theocratic government of all times is that established by Moses among the Israelites.

Theocritus (thē-ok'ri-tus), a Greek poet, born at Syracuse, who flourished about B.C. 280. We have under his name thirty idyls, or pastoral poems, of which, however, several are probably by other authors. Most of his idyls have a dramatic form, and consist of the alternate responses of musical shepherds. His language is strong and harmonious, and his poetical ability high, his bucolic poems being regarded as masterpieces of their kind.

Theodolite (thē-od'u-līt), a surveying instrument for measuring horizontal and vertical angles by means of a telescope, the movements of which can be accurately marked. This instrument is variously constructed, but

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its main characteristics continue unaltered in all forms. Its chief features are the telescope, a graduated vertical circle to which it is attached, two concentric horizontal circular plates which turn freely on each other, and two spirit-levels on the upper plate to secure exact horizontality, the whole being on a tripod stand. The lower plate contains the divisions of the circle round its edge, and the upper or vernier plate has two vernier divisions diametrically opposite. The

Theodolite.

plates turn on a double vertical axis. To measure the angular distance horizontally between any two objects, the telescope is turned round along with the vernier circle until it is brought to bear exactly upon one of the objects; it is then turned round until it is brought to bear on the other object, and the arc which the vernier has described on the graduated circle measures the angle required. By means of the double vertical axis the observation may be repeated any number of times in order to ensure accuracy. The graduated vertical circle is for taking altitudes or vertical angles in a similar way. The theodolite is a most essential instrument in surveying and in geodetical operations.

Theodora (thē-o-dō'ra), the wife of the Byzantine emperor Justinian, of low birth, at one time a dancer on the stage, and notorious for licentiousness. She later assumed the character of a pious benefactor of the church, and died in 548, aged forty. See *Justinian I.*

Theodore (thē'u-dōr), one of the most distinguished ecclesiastical writers of his age, born at Antioch about the middle of the fourth century. Early in life he followed the example of Chrysostom in embracing the monastic life. He was ordained priest, and for fifty years distinguished himself as a zealous opponent of the heresies of Arius, Apollinarius, and others. From Antioch he removed to Tarsus, and in the year 392 or 394 was chosen bishop of Mopsuestia in Cilicia, dying in 429. Only a few fragments of his works are extant, the most important of them being commentaries on almost all the books of the Bible, and various polemical treatises. His doctrine approximated somewhat to that of Pelagius, and was later considered heretical.

Theodore II, King of Abyssinia, born in the province of Kwara in 1818, for many years a rebel, finally fought his way to the throne (1855). He was a man of great parts, an inveterate foe of Islamism, a born ruler, and an intelligent reformer. But intolerance of any power save his own finally made a tyrant of him; and in consequence of the imprisonment of Consul Cameron and other British subjects he brought upon himself a war with England, which ended, April 13, 1868, in the storming of Magdala and the death (supposedly by suicide) of Theodore. See *Abyssinia.*

Theodoret (thē-od'u-ret), a distinguished ecclesiastical historian and theological writer, born at Antioch about the close of the fourth century, and in 420 or 423 raised to the bishopric of Cyrus or Cyrrhus. Becoming involved later in the quarrel between Nestorius and the overbearing and intolerant Cyril of Alexandria, he was deposed at the so-called robber council of Ephesus, a sentence which was reversed by the general council of Chalcedon in 451. Theodoret appears to have died in 457 or 458. The most important of his works consist of commentaries on numerous books of the Old Testament and on the Pauline epistles; *Ecclesiastical History, History of Heresies,* etc.

Theodoric (thē-od'u-rik), King of the Ostrogoths; born in A.D. 455, died in 526; was the son of Theodemir, king of the Ostrogoths of Pannonia. From his eighth to his eighteenth year he lived as a hostage with the Emperor Leo at Constantinople. Two years after his return he succeeded to the throne. In 493, after several bloody engagements, Theodoric induced Odoacer, who had assumed the title of King of Italy, to grant him equal authority. The murder of Odoacer at a banquet soon after opened the way for Theodoric to have himself proclaimed sole ruler. The-

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odoric ruled with great vigor and ability. He attached his soldiers to his service by assigning them a third part of the lands of Italy, on the tenure of military service; while among his Italian subjects, whom he conciliated by introducing an improved administration of justice, he encouraged industry and the arts of peace. Although, like his ancestors, he was an Arian, he never violated the peace or privileges of the Catholic Church.

Theodosius (thē-o-dō'shi-us), a Christian Roman emperor, born in Spain about 364, and selected by the Emperor Gratian, in 379, for his partner in the empire. To his care were submitted Thrace and the eastern provinces, which he delivered from an invasion of the Goths, concluding a peace with them in 382. On the defeat and death of Maximus (388) he became the sole head of the empire, Gratian having been previously killed in the war against Maximus. In 390 a sedition took place in Thessalonica, and in revenge for this act, Theodosius caused the people of the city to be invited to an exhibition at the circus, and when a great concourse had assembled they were barbarously murdered by his soldiery, to the number, it is computed, of 7000. St. Ambrose refused him communion for eight months on account of this crime, and Theodosius submitted humbly to the punishment. He died at Milan, A.D. 395, leaving the eastern portion of the empire to his son Arcadius, the western to his son Honorius. He distinguished himself by his zeal for orthodoxy, and his intolerance and persecution of Arianism and other heresies.

Theology (thē-ol'o-ji; Greek *Theos*, God, and *logos*, doctrine) is the science which treats of the existence of God, his attributes, and the Divine will regarding our actions, present condition, and ultimate destiny. In reference to the sources whence it is derived, theology is distinguished into *natural* or *philosophical* theology, which relates to the knowledge of God from his works by the light of nature and reason; and *supernatural, positive*, or *revealed theology*, which sets forth and systematizes the doctrines of the Scriptures. With regard to the contents of theology, it is classified into *theoretical theology* or *dogmatics*, and *practical theology* or *ethics*. As comprehending the whole extent of religious science, theology is divided into four principal classes, *historical, exegetical, systematic*, and *practical theology*. Historical theology treats of the history of Christian doctrines. Exegetical theology embraces the interpretation of the Scriptures and Biblical criticism. Systematic theology arranges methodically the great truths of religion. Practical theology consists of an exhibition, first, of precepts and directions; and secondly, of the motives from which we should be expected to comply with these. *Apologetic* and *polemic* theology belong to several of the above-mentioned four classes at once. The *scholastic theology* attempted to clear and discuss all questions by the aid of human reason alone, laying aside the study of the Scriptures, and adopting instead the arts of the dialectician.

Theophrastus (thē-o-fras'tus), a celebrated Peripatetic philosopher, was born at Lesbos early in the fourth century B.C., and studied at Athens, in the school of Plato, and afterwards under Aristotle, of whom he was the favorite pupil and successor. On the departure of Aristotle from Athens after the judicial murder of Socrates he became the head of the Peripatetic school of philosophy, and composed a multitude of books — dialectic, moral, metaphysical, and physical. We possess two entire books of his botany, but only fragments of his other works, such as those on *Stones*, on the *Winds*, etc.; and his *Characters* or sketches of types of character, by far the most celebrated of all his productions. He died in 287 B.C. To his care we are indebted for the preservation of the writings of Aristotle, who, when dying, intrusted them to his keeping.

Theophrastus Paracelsus.

See *Paracelsus*.

Theosophy (thē-os'u-fi), according to its etymology the science of divine things. But the name of *theosophists* has generally been applied to persons who in their inquiries respecting God have run into mysticism, as Jacob Böhme, Swedenborg, St. Martin, and others. At the present day the term is applied to the tenets of the Theosophical Society, founded in New York in 1875 by Henry S. Olcott, the objects of which are: to form the nucleus of a universal brotherhood of humanity, to promote the study of Eastern literature and science, and chiefly to investigate unexplained laws of nature, and the physical powers of man, and generally the search after divine knowledge — divine applying to the divine nature of the abstract principle. not to the quality of a personal God. The theosophists assert that humanity is possessed of certain powers over nature, which the narrower study of nature from the merely materialistic stand-point has

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failed to develop. They maintain the Hindu doctrine of transmigration of souls. The membership in the United States is about 5000. Mrs. Annie Besant is at present the president of the society.

Thera. See *Sanatoria.*

Therapeutæ (ther-a-pū'tē), a Jewish sect of devotees of the first century after Christ, somewhat akin to the Essenes.

Therapeutics (ther-a-pū'tiks), that department of medicine which treats of remedies in the widest sense.

Theresa (te-rē'sa), St., a religious enthusiast, born at Avila, in Spain, in 1515, who took the veil among the Carmelites at the age of twenty-four. Being dissatisfied at the relaxation of discipline in the order to which she belonged she undertook to restore the original severity of the institute. The first convent of reformed Carmelite nuns was founded at Avila in 1562, and was speedily followed by a number of others. She died in 1582, and was canonized by Pope Gregory XV in 1621.

Theresiopel (tā-rā-sē-ō'pel), or MARIA-THERESIENSTADT (Hung. *Szabaaka*), a royal free town in Hungary, in the county of Bács, is more properly a district than a town, as it covers, with its numerous suburbs, an area of more than 600 square miles. It has manufactures of linen and woolen cloth, dye-works, tanneries, soap-boiling works, etc., and a trade in cattle, horses, hides, etc. Pop. 82,122.

Thermæ (ther'mē), a name often given to the large bathing establishments of ancient Rome.

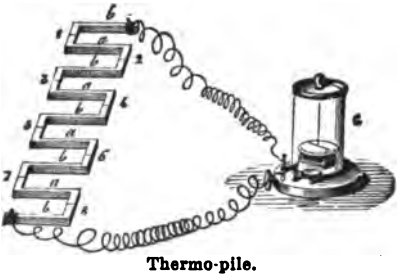
Thermidor (ther'mi-dor), the eleventh month of the year in the calendar of the first French republic. It commenced on July 19th and ended on August 17th. See *Calendar.*

Thermit, the name given a mixture of aluminum powder or filings and powdered oxide of iron, used for welding the ends of iron rails or fractures in iron goods. If set on fire it yields a temperature of 5400° F., far above the melting point of iron. In burning it produces practically pure iron in a liquid state and oxide of aluminum as a slag. The molten iron fills the fracture or the space between the rails, which it welds in hardening.

Thermodynamic Engine (thermō-dīnam'ik) any form of heat engine (as gas or steam engines) by means of which a percentage of the heat lost by one body called the source, on account of its connection with another body called the refrigerator, is converted into kinetic energy or mechanical effect, and made available for the performance of work. The efficiency of a heat engine is the ratio of the heat available for mechanical effect to the total heat taken from the source. A reversible engine is called a perfect engine, because it is the most efficient engine between the temperatures of its source and the refrigerator.

Thermodynamics, that department of physical science which investigates the laws regulating the conversion of heat into mechanical force or energy, and vice versa.

Thermo-electricity, electricity produced at the junction of two metals, or at a point where a molecular change occurs in a bar of the same metal, when the junction or point is heated above or cooled below the general temperature of the conductor. Thus when wires or bars of metal of different kinds, as bismuth and antimony, are placed in close contact, end to end, and disposed so as to form a periphery or continuous circuit, and heat then applied to the ends or junctions of the bars, electric currents are produced. The principle of the arrangement is shown in the accompanying figure, in which the bars marked *a* are antimony, those marked *b* bismuth. The junctions 1, 3, 5, 7 are to be at one temperature, the junctions 2, 4,



Thermo-pile.

6, 8 at another. G is a delicate galvanometer which measures the force of the current produced. The thermo-electric battery or pile, an apparatus much used in delicate experiments with radiant heat, consists of a series of little bars of antimony and bismuth (or any other two metals of different heat-conducting power), having their ends soldered together and arranged in a compact form; the opposite ends of the pile being connected with a galvanometer, which is very sensibly affected by the electric current.

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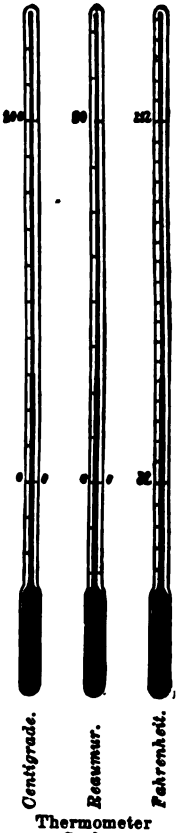
induced in the system of bars when exposed to the slightest variations of temperature. To the combined arrangement of pile and galvanometer the name of *thermo-multiplier* is given. Two metal bars of different heat-conducting power having their ends soldered together, and the combined bar then usually bent into a more or less horseshoe or magnet form for the purpose of bringing their free ends within a conveniently short distance, designated a thermo-electric pair, are much used in thermo-electric experiments. But as the electric current developed in a single pair is very weak, a considerable number are usually combined to form a thermo-electric pile or battery. Bismuth and antimony are the metals usually employed, the difference in electro-motive force being greater between them than between any other two metals conveniently obtainable.

Thermograph (ther'mu-graf), a thermometer provided with a registering device; and mechanism for reading temperature. The United States Weather Bureau uses a crescent-shaped bulb filled with alcohol and hermetically sealed. Changes of temperature affect the curve of the bulb, and its alteration of form is communicated to a series of multiplying levers, which act upon a recording pen. Bartlett's thermograph is designed for greenhouses, it being electrically connected with dials in the house and office, so that changes in temperature can be readily noted.

Thermometer (ther-mom'e-ter), an instrument by which the temperatures of bodies are ascertained; founded on the property which heat possesses of expanding all bodies, the rate or quantity of expansion being supposed proportional to the degree of heat applied, and hence indicating that degree. The thermometer consists of a slender glass tube, with a small bore, containing in general mercury or alcohol, which expanding or contracting by variations in the temperature of the atmosphere, or on the instrument being brought into contact with any other body, or immersed in a liquid or gas which is to be examined, the state of the atmosphere, the body, liquid, or gas, with regard to heat, is indicated by a scale either applied to the tube or engraved on its exterior surface. The ordinary thermometer consists of a small tube terminating in a ball containing mercury, the air having been expelled and the tube hermetically sealed. A scale of temperatures is attached, in which there are two points corresponding to fixed and determinate temperatures, one, namely, to the temperature of freezing water and the other to that of boiling water. In the thermometer commonly used in the United States and the British empire, known as Fahrenheit's thermometer, the former point is marked 32° and the latter 212°; hence the zero of the scale, or that part marked 0°, is 32° below the freezing-point, and the interval or space between the freezing and boiling points consists of 180°. The zero point is supposed to have been fixed by Fahrenheit at the point of greatest cold that he had observed, probably by means of a freezing mixture such as snow and salt. In France and other parts of Europe, and nowadays in all scientific investigations, the Centigrade or Celsius scale is used. In this the space between the freezing and boiling points of water is divided into 100 equal parts or degrees, the zero being at freezing and the boiling-point marked 100°. Réaumur's thermometer, in use in Germany, has the space between the freezing and boiling points divided into 80 equal parts, the zero being at freezing. The following formulæ will serve to convert any given number of degrees of Fahrenheit's scale into the corresponding number of degrees on Réaumur's and the Centigrade scales, and *vice versa:* let F, R, and C (the 0° of C. and R. being equal to F. 32°, and the three scales from freezing to boiling point being F. 180°, C. 100°, R. 80°, or in the ratio of 9, 5, 4) represent any corresponding numbers of degrees on the three scales respectively, then: (F.— 32°) $\times \frac{4}{9} = R.$; (F.— 32°) $\times \frac{5}{9} = C.$; R. $\times \frac{9}{4} + 32° = F.$; C. $\times \frac{9}{5} + 32° = F.$; C. $\times \frac{4}{5} = R.$; R. $\times \frac{5}{4} = C.$ For extreme degrees of cold, thermometers filled with spirit of wine must be employed from its



Thermometer Scales.

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great resistance to freezing temperatures, whereas mercury freezes at about 39° below zero on the Fahrenheit scale. On the other hand, spirit of wine is not adapted to high temperatures, as it is soon converted into vapor, whereas mercury does not boil till its temperature is raised to 660° F. As the ordinary thermometer gives the temperature only at the time of observation, the necessity for having an instrument which would show the maximum and minimum temperatures within a given period is easily apparent in all cases connected with meteorology, and various forms of instruments for this purpose have been invented. A common form of *maximum thermometer* consists of the ordinary thermometer fitted with a piston which moves easily in the tube. The instrument is placed horizontally, and the piston is pushed along the bore as the mercury advances, and is left at the highest point by the retiring fluid. This point is noted by the observer, who then erects the thermometer, causing the piston to sink to the mercury, the instrument thus being in condition for a fresh experiment. A similar action takes place in the spirit of wine *minimum thermometer*, the small movable piston being, however, immersed in the fluid and drawn back by the convex surface of the contracting fluid, being left at the point of greatest contraction. The maximum and minimum instruments combined form the *self-registering thermometer*.

Thermo-pile. See *Thermo-electricity*.

Thermopylæ (ther-mop'e-lē), a narrow defile in Northern Greece, leading from Thessaly southward, between Mount Œta and the sea (the Maliac Gulf, now the Gulf of Zeitouni), 25 miles north of Delphi, celebrated for its brilliant defense by 300 Spartans, together with allies, under Leonidas, against the Persian host under Xerxes, in 480 B.C.

Theseus (thē'sūs), a mythical king of Athens and famous hero of antiquity, son of Ægeus by Æthra, the daughter of Pittheus of Troezen, in Peloponnesus, of whom many notable deeds are related, as the slaying of the Minotaur and the freeing of Athens from the tribute of seven youths and seven maidens annually sent to Crete to be devoured by that monster. As king of Athens he is reputed to have governed with mildness, instituted new laws, and made the government more democratic.

Thespis (thes'pis), a native of a village near Athens, who lived in the sixth century B.C., reputed to be the inventor of tragedy and of the masks which the Greek actors always wore in performing. His first representation took place in 535 B.C. See *Drama*.

Thessalonians (thes-a-lō'ni-ans), EPISTLES TO THE, two New Testament epistles written by St. Paul to the church at Thessalonica, in all probability during his long stay at Corinth, and therefore not very long after the foundation of the Thessalonian church on St. Paul's second missionary journey. A note at the end of each of the epistles in our *Authorized Version* states that they were written from Athens, but there can be little doubt that this is erroneous, and that they were really written at Corinth. They are the earliest of Paul's writings, and are characterized by great simplicity of style as compared with his other epistles. The genuineness of the first epistle has hardly ever been questioned, but according to the newer criticism, that of the second epistle is more than doubtful.

Thessalonica (thes-a-lō-nē'ka). See *Saloni'ca*.

Thessaly (thes'a-li), the northeastern division of Greece, mainly consisting of a rich plain inclosed between mountains and belonging almost entirely to one river basin, that of the Peneios (Salambria), which traverses it from west to east, and finds an outlet into the Ægean through the vale of Tempe. In the earliest times Thessaly proper is said to have been inhabited by Æolic and other tribes. Subsequently it was broken up into separate confederacies, and seldom exerted any important influence on the affairs of Greece generally. Thessaly was conquered by Philip of Macedon in the fourth century B. C., became dependent on Macedonia, and was finally incorporated with the Roman Empire. After the fall of the Byzantine Empire it fell into the hands of the Turks, became a part of the Ottoman Empire, although most of the inhabitants are Greeks. The greater portion of it was in 1881 incorporated with the kingdom of Greece. Capital Larissa. Pop. 344,000.

Thetford (thet'fĕrd), a municipal borough of England, partly in the county of Suffolk and partly in that of Norfolk, on both banks of the Ouse, here crossed by a handsome iron bridge. It is a place of great antiquity and has a remarkable Celtic Mound called Castle Hill. Pop. 4778.

Thetford Mines, a city of Quebec province, Canada, 26 miles S. W. of Quebec. It has rich asbestos mines. Pop. (1913) 7500.

Thetis (thē'tis), a Greek divinity, a daughter of Nereus and Doris, therefore one of the Nereids. By Peleus,

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many marched against Frederick, who, with an army of Bohemians, Moravians, and Hungarians, kept the field until November 8 (1620), when he was totally routed at Weissenberg, near Prague, by Duke Maximilian of Bavaria. The Protestant cause was now crushed in Bohemia, and the people of that province suffered cruel persecution. The dominions of Frederick, the Palatinate of the Rhine included, were now conquered, the latter being occupied by Count Tilly, assisted by the Spaniards under Spinola. At the Diet of Ratisbon (March, 1623) Frederick was deprived of his territories, Duke Maximilian receiving the Electorate. Ferdinand, whose succession to the throne of Bohemia was thus secured, had now a favorable opportunity of concluding a peace, but his continued intolerance towards the Protestants caused them to seek foreign assistance, and a new period of the war began. Christian IV of Denmark, induced partly by religious zeal and partly by the hope of an acquisition of territory, came to the aid of his German co-religionists (1624), and being joined by Mansfeld and Christian of Brunswick, advanced into Lower Saxony. There they were met by Wallenstein, Duke of Friedland, who, in 1626, defeated Mansfeld at Dessau, while Tilly was also successful in driving Christian back to Denmark. In the peace of Lübeck which followed (May, 1629) Christian of Denmark received back all his occupied territory, and undertook not to meddle again in German affairs. After this second success, Fredinand again roused his people by an edict which required restitution to the Catholic Church of all churchlands and property acquired by them since 1555. To the assistance of the Protestants of Germany, in these circumstances, came Gustavus Adolphus, King of Sweden, who landed (1630) with a small army upon the coast of Pomerania. Joined by numerous volunteers, and aided by French money, he advanced, and routed Tilly at Breitenfeld (or the battle of Leipzig, September, 1631), victoriously traversed the Main and the Rhine valleys, defeated Tilly again near the confluence of the Lech and the Danube (April, 1632), and entered Munich. Meanwhile the emperor sought the aid of Wallenstein, by whose ability and energy Gustavus was obliged to retire to Saxony, where he gained the great victory of Lützen (Nov., 1632), but was himself mortally wounded in the battle. The war was now carried on by the Swedes under the chancellor Oxenstierna, till the rout of the Swedish forces at Nördlingen (Sept., 1634) again gave to the emperor the preponderating power in Germany. The Elector of Saxony, who had been an ally of Gustavus, now made peace at Prague (May, 1635), and within a few months the treaty was accepted by many of the German princes. The Swedes, however, thought it to their interest to continue the war, while France resolved to take a more active part in the conflict. Thus the last stage of the war was a contest of France and Sweden against Austria, in which the Swedish generals gained various successes over the imperial forces, while the French armies fought with varied fortune in West Germany and on the Rhine. Meanwhile the emperor had died (1637), and had been succeeded by his son, Ferdinand III. The struggle still continued until, in 1646, the united armies of the French, under the great generals Turenne and Conde, and the Swedes advanced through Suabia and Bavaria. The combined forces of Sweden, Bavaria, and France were then about to advance upon Austria, when the news reached the armies that the Peace of Westphalia (1648) was concluded, and that the long struggle was ended.

Thisbe (thiz'be). See *Pyramus and Thisbe.*

Thistle (this'l), the common name of prickly plants of the tribe Cynaraceæ, nat. order Compositæ. There are numerous species, most of which are inhabitants of Europe. The blessed-thistle, *Carduus benedictus* of the pharmacopœias, *Cnicus benedictus* or *Cirsium benedictum* of modern botanists, is a native of the Levant, and is a laxative and tonic medicine. The cotton-thistle belongs to the genus *Onopordum.* The common cotton-thistle (*O. Acanthium*) attains a height of from 4 to 6 feet. It is often regarded as the Scotch thistle, but it is doubtful whether the thistle which constitutes the Scottish national badge has any existing type, though the stemless thistle (*Cnicus acaulis* or *Cirsium acaule*) is in many districts of Scotland looked on as the true Scotch thistle. Some dozen species of thistle are common in the United States, spreading from New England to Florida, among them the Canada thistle, one of the severest pests of the farmer.

Thistle, Order of the, a Scottish order of knighthood, sometimes called the order of St. Andrew. It was instituted by James VII (James II of England) in 1687, when eight knights were nominated. It fell into abeyance during the reign of William and Mary, but was revived by Queen Anne

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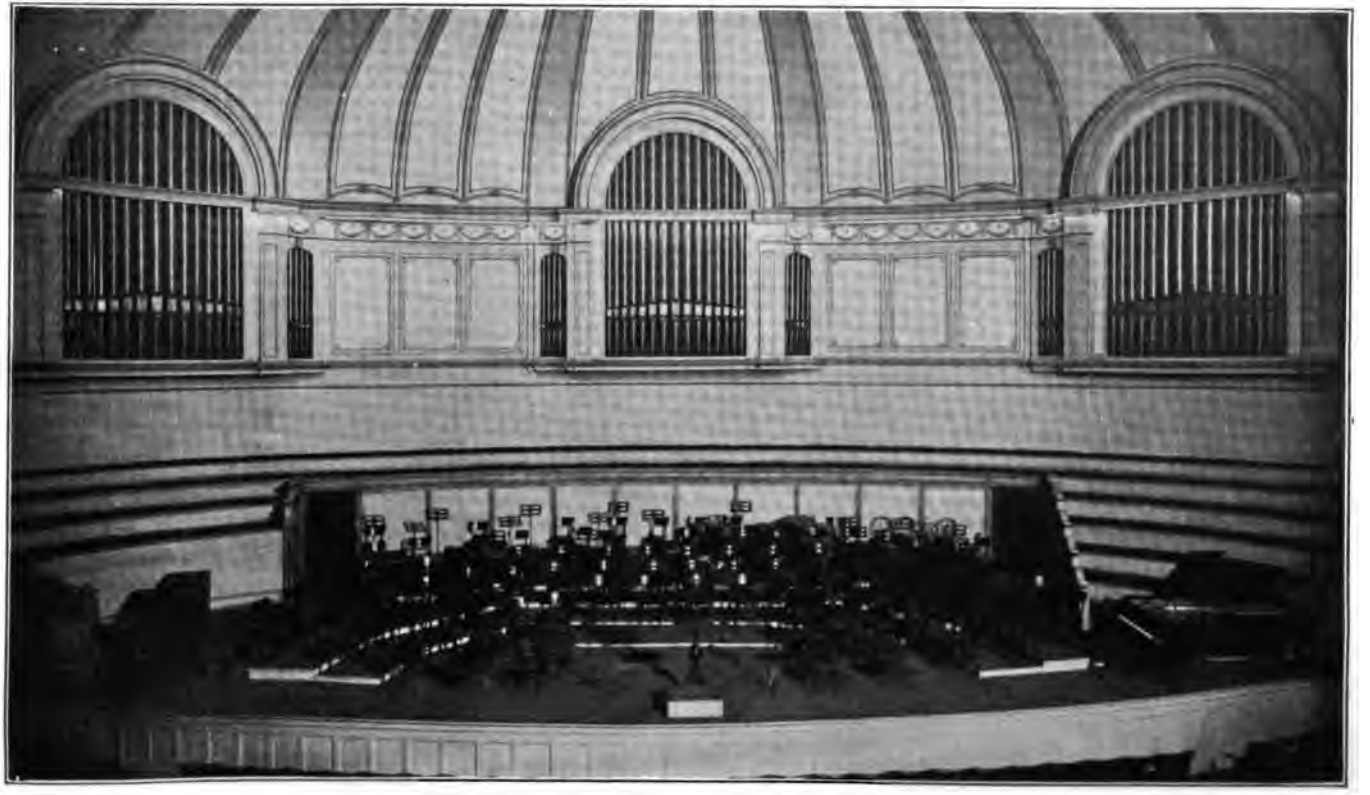

THE STAGE OF ORCHESTRA HALL, CHICAGO

The home of the famous Thomas Orchestra, one of the greates' musical organisations in the world.

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in 1703. The insignia of the order consist of a gold collar composed of thistles interlaced with sprigs of rue; the jewel, a figure of St. Andrew in the middle of a star of eight pointed rays, suspended from the collar; the star, of silver and eight-rayed, four of the rays being pointed, while the alternate rays are shaped like the tail-feathers of a bird, with a thistle in the center surrounded by the Latin motto *Nemo me impune*

Order of the Thistle—Star, Jewel, Badge and Collar.

lacessit; and the badge, oval, with the motto surrounding the figure of St. Andrew. The order consists of the sovereign and sixteen knights, besides extra knights (princes), and a dean, a secretary, the lyon-king-at-arms, and the gentleman usher of the green rod.

Tholen (tō'len), an island in the province of Zealand, Holland, between the Scheldt and the Maas, with an area of about 50 sq. miles, and a pop. of 15,000.

Tholuck (tō'lŭk), FRIEDRICH AUGUST GOTTREU, a German theologian, born in 1799; died in 1877. He was educated at the universities of Breslau and Berlin, and devoted himself to theology. Tholuck filled the chair of theology at Halle from 1826 till his death.

Thomas, GEORGE HENRY, general, was born in Virginia in 1816, and at the age of twenty entered the military academy at West Point, passing into the artillery as sublieutenant at the age of twenty-four. He took part in the Mexican war (1846-47); was appointed professor at West Point in 1850; recalled to active service in 1855, and employed in Texas against the Indians. When the Civil War broke out Thomas had attained the rank of major, and being appointed lieutenant-colonel of volunteers, April 25, 1861, was some months later sent into Kentucky, where, in the following year, he defeated Zollikofer. As major-general of volunteers he took part in the battle of Murfreesborough, where he greatly distinguished himself; while at the bloody battle of Chickamauga, in September, 1863, he saved the Federal army from destruction by his stubborn resistance after the defeat of the Federal right, earning the name of 'The Rock of Chickamauga.' In 1865 he compelled the Confederates to raise the siege of Nashville, for which he received the thanks of Congress, and was raised to the rank of major-general in the regular army. The brevet ranks of lieutenant-general and general were offered him by President Johnson, but he declined them. He died in 1870.

Thomas (tom'as), JOSEPH, scholar and linguist, born in Cayuga Co., New York, in 1811, was, with Thomas Baldwin, author of *Baldwin's Pronouncing Gazetteer.* In 1851-52 appeared his first book of *Etymology,* followed by an edition of Oswald's *Etymological Dictionary.* In 1854 he prepared *A New and Complete Gazetteer of the United States;* and in 1855 *A Complete Geographical Dictionary of the World* (popularly known as *Lippincott's Gazetteer of the World*), and which for accuracy and completeness had scarcely an equal. In 1864 appeared his comprehensive *Medical Dictionary;* and in 1870 his *Universal Pronouncing Dictionary of Biography and Mythology,* which occupies a high place among books of reference. He died December 24, 1891.

Thomas, THEODORE, noted orchestral leader, born in Germany in 1835; died in 1905. His family moved to the United States in 1845, and he became an expert on the violin. His symphony concerts began in 1864, and for thirty years he was conductor of the Brooklyn Philharmonic Society. His later years were passed in Chicago, where the Symphony Hall was built through his efforts.

Thomas à Kempis (that is, *Thomas of Kempen,* his birthplace, in the archbishopric of Cologne) was born about 1380. At the age of twenty he retired to an Augustine convent near Zwolle, in Holland, where

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he took the vows, and where, in 1471, he died sub-prior of the convent. He copied many MSS. in a beautiful hand and wrote numerous original works, including sermons, exhortations, ascetic treatises, hymns, prayers, etc. His name, however, would hardly be remembered were it not for its connection with the celebrated devotional work called *The Imitation of Christ*, 'De Imitatione Christi,' a work which has passed through thousands of editions in the original Latin and in translations. The authorship of this book has long been a disputed point; but it is generally ascribed to à Kempis.

Thomasville, a town and health resort, county seat of Thomas Co., Ga., 200 miles w. s. w. of Savannah. It has a lumber trade, various industries. Pop. 6727.

Thomists, the followers of Thomas Aquinas. See *Scholasticism.*

Thompson, ALMON HARRIS, born in Stoddard, N. H., in 1839; died in 1906. He became a member of the United States Topographic Engineers in 1870. In 1882 he was appointed geographer to the United States Geological Survey, and (1884–95) did important work in connection with the survey west of the Mississippi.

Thompson, BENJAMIN, COUNT RUMFORD, an American scientist and Bavarian administrator, born at Woburn, Mass., in 1753; died at Auteuil, near Paris, in 1814. He commanded the King's American Dragoons in the Revolutionary War, and became aide-de-camp and chamberlain at the court of the elector of Bavaria (1784–1802). He left funds to Harvard for the professorship of physical and mathematical sciences and to the American Academy of Arts and Sciences and the Royal Society of London for prizes for the most important discoveries in heat and light.

Thompson, DENMAN, actor and playwright, born near Girard, Pennsylvania, in 1833; died in 1911. He is best known by his *Joshua Whitcomb*, remodeled into the highly popular play of *The Old Homestead*, in which he long took the leading part.

Thompson, FRANCIS, an English poet, born at Ashton, Lancashire in 1860; died in London, November 13, 1907. His early life closely resembled that of DeQuincey, but he was finally befriended and launched upon the career of journalist and poet. His verse, while often eccentric and even forced, abounds in passages of rare beauty.

Thompson, JEROME, painter, was born at Middleborough, Massachusetts, in 1814; died in 1886. Aside from portraits, his principal pictures are scenes from rustic American life, such as *The Apple Gathering*, *The Old Oaken Bucket*, *the Old Stage*, and *The Lost Lamb*. Many of his works have been made familiar by engravings.

Thompson, SIR JOHN SPARROW, Canadian statesman, born at Halifax in 1844; died in 1894. He entered early into public life and became premier of Nova Scotia in 1882. He was appointed attorney general of the Dominion in 1885 and became prime minister in 1892. He took part in the fishery treaty and the Behring Sea arbitration.

Thompson, LAUNT, sculptor, born in Queens Co., Ireland, in 1833; died in New York in 1894. From 1874 to 1881 he resided in Rome. He achieved great success as a portrait sculptor, and was elected a member of the Academy of Design in 1862.

Thompson, MAURICE, poet and novelist, born at Fairfield, Indiana, in 1844; died in 1901. His principal works are: *Hoosier Mosaics*, *The Witchery of Archery*, *A Tallehassee Girl*, *His Second Campaign*, and *Songs of Fair Weather*.

Thompson, ROBERT ELLIS, educator, was born in Ireland in 1844, came to America in 1857, was graduated from the University of Pennsylvania in 1865, and in 1873 was ordained minister in the Reformed Presbyterian Church. He was successively professor of mathematics, of social science, and of history and English literature in the University of Pennsylvania, and has been president of the Central High School of Philadelphia since 1894. He was editor of the *Penn Monthly*, 1870-80, and became editor of *The American* in 1880. He wrote *Social Science and Political Economy* and *Elements of Political Economy*.

Thompson-Seton, ERNEST EVAN, naturalist author, was born at South Shields, England, in 1860. He lived as a boy in the Canadian woods and on the western plains, became naturalist to the government of Manitoba, and wrote *Birds of Manitoba* and *Mammals of Manitoba*. He afterwards studied art and became an animal painter and illustrator. He also became an active lecturer and wrote many popular books describing the habits and intelligence of animals. The best known among these is *Wild Animals I Have Known*. Other writers followed him in this field and a controversy arose as to the truthfulness of their stories of animal intelligence. The conception

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of the organization of Boy Scouts, now so popular, is ascribed to him, though not the title, and he is the leading spirit in this organization in the United States (see *Boy Scouts*). His name was legally changed from Seton-Thompson to Thompson-Seton in 1901.

Thoms (toms), William John, an English author, born at Westminster in 1803; died in 1885. He was secretary to the Camden Society from 1838 to 1873; deputy-librarian to the House of Lords; originator and for many years editor of *Notes and Queries*, and author of various antiquarian works.

Thomson (tom'sun), Sir Charles Wyville, naturalist, born in 1830 in Linlithgowshire; died in 1882. Educated at the University of Edinburgh, he became professor of mineralogy and geology in Queen's College, Belfast, in 1854. In the dredging expeditions of the *Lightning* and *Porcupine* (1868-69) he took part, afterwards publishing in *The Depths of the Sea* (1869), the substance of his discoveries in regard to the fauna of the Atlantic. In 1869 he became fellow of the Royal Society; in 1870 professor of natural history in the University of Edinburgh. In 1872 he was appointed scientific chief of the *Challenger* expedition, which was absent from England 3½ years, during which time 68,890 miles were surveyed. On his return he was knighted, and entrusted by the government with the task of drawing up a report on the natural history specimens collected during the expedition. But he lived only to publish a preliminary account of the expedition, *The Voyage of the Challenger: the Atlantic* (1876-78).

Thomson, Elihu, an American electrician, born in Manchester, England, March 29, 1853; came to the United States and subsequently secured more than 500 patents for inventions which included the Thompson method of electric welding. He was awarded the Grand Prix, in Paris, in 1889, for electrical inventions, received the decoration of Chevalier of the Legion of Honor, for electrical research, etc.

Thomson, James, poet, was born in 1700, at Ednam, near Kelso, in Scotland, his father being minister of Ednam parish, and was educated at Jedburgh and the University of Edinburgh. He went in 1725 to London, where *Winter*, the first of his poems on the seasons, was published in 1726. In 1727 he published his *Summer*, his *Poem to the Memory of Sir Isaac Newton*, and his *Britannia;* in 1728 his *Spring* and in 1730 his *Autumn*. After traveling for some time on the Continent with the son of Sir Charles Talbot, the chancellor, he was rewarded with the post of secretary of briefs, which he held till the death of the chancellor (1737), when he received a pension of £100 from the Prince of Wales. Meanwhile he had brought on the stage his tragedy of *Sophonisba* (1729) and published his poem on *Liberty*, the cool reception of which greatly disappointed him. He now (1738) produced his tragedy of *Agamemnon*, and a third entitled *Edward and Eleanora*. In 1740 he composed the masque of *Alfred* in conjunction with Mallet; but which of them wrote the famous song, *Rule, Britannia*, is not known. In 1745 his most successful tragedy, *Tancred and Sigismunda*, was brought out and warmly applauded. The following year he produced his *Castle of Indolence*, a work in the Spenserian stanza. For a few years he held by deputy the confortable post of surveyor-general of the Leeward Islands, and he died in 1748. He left a tragedy entitled *Coriolanus*, which was acted for the benefit of his relatives. Thomson was greatly beloved for his amiability and kindness of heart. His *Seasons*, on which his fame rests, abounds in sensibility and beauty of natural description. His *Castle of Indolence*, though not so popular as the *Seasons*, is highly esteemed, but his tragedies are almost forgotten.

Thomson, James, poet, was born at Port-Glasgow, Scotland, in 1834, and was brought up at the Caledonian Orphan Asylum, both his parents having died when he was very young. He became a schoolmaster in the army, but quitted that occupation in 1862, and became clerk in a solicitor's office. In 1860 he became a contributor to the *National Reformer*, in which was published, under the signature 'B. V.,' *The Dead Year*, *To Our Ladies of Death*, and the poem by which he is best known, *The City of Dreadful Night* (1874). Among his other works are: *Tasso and Leonora* (1856); *The Doom of a City* (1857); *Sunday at Hampstead* (1863); *Sunday up the River* (1868); *A Voice from the Nile* (1881), and *Insomnia* (1882). Thomson's verse is characterized by much brilliancy and traits of graceful humor, but its prevailing tone is one of despair. He died in 1882.

Thomson, John, a landscape painter, born at Dailly, Scotland, in 1776, succeeded his father as minister of that parish in 1800, and exchanged that living for Duddingston, near Edin-

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burgh, in 1805, dying there in 1840. Thomson early turned his attention to art, and produced a large number of landscapes, which are considered to rank him among the best painters of his native land.

Thomson, JOSEPH, an African explorer, was born at Penpont, Scotland, in 1858, and was educated at Edinburgh. When twenty years of age he accompanied Keith Johnston to Central Africa, assuming full charge of the expedition on the death of Mr. Johnston. In 1882 he explored the Rovuma in East Africa, and in 1884 made an important journey through Masai Land, in eastern equatorial Africa. Among his other achievements are an expedition to the Atlas Mountains, and one to the river Niger. He was a graphic writer, his published works including *Through Masai Land, To the Central African Lakes and Back, Travels in the Atlas and Southern Morocco, Life of Mungo Park*, etc. He died in 1895.

Thomson, JOSEPH JOHN, physicist, was born near Manchester, England, in 1856, a cousin of Lord Kelvin. He became professor of experimental physics at Cambridge in 1884, and wrote *Vortex Rings, Recent Researches in Electricity and Magnetism*, etc. He is especially notable for his researches into the constitution of the atom of matter, and the promulgation of the theory of the electron, now so widely accepted as the basic element of material nature. His studies into the characteristics of this have been intimate and profound.

Thomson, THOMAS, a Scottish chemist, born at Crieff in 1773; died in 1852. He adopted the medical profession, and embraced chemistry more especially as his favorite pursuit. In 1802 he published the first edition of his *System of Chemistry*, which obtained rapid success both in Great Britain and on the Continent. It was followed in 1810 by his *Elements of Chemistry*, and in 1812 by his *History of the Royal Society*. In 1813 he went to London and commenced there a scientific journal, the *Annals of Philosophy*, which he continued to edit till the end of 1820. The lectureship (afterwards the regius professorship) in chemistry in Glasgow University was conferred on him in 1817. His great work on the atomic theory was published in 1825, under the title of *Attempt to Establish the First Principles of Chemistry by Experiment*. In 1830–31 he published his *History of Chemistry*, in two volumes, and in 1836 appeared his *Outlines of Mineralogy and Geology*.

Thomson, THOMAS, antiquary, brother of the Rev. John Thomson, of Duddingston, was born at Dailly, Scotland, in 1768; died in 1852. He was called to the Scottish bar in 1793, appointed deputy-clerk register, 1806, and principal clerk of session, 1828. He was an early contributor to the *Edinburgh Review*, and president of the Bannatyne Club, for which and for the Maitland Club he edited numerous valuable works.

Thomson, WILLIAM, Archbishop of York, was born at Whitehaven, Feb. 11, 1819, and was educated at Shrewsbury School and Queens College, Oxford, of which he was successively fellow, tutor, and head. In 1858 he was chosen preacher of Lincoln's Inn, and in 1859 was appointed one of her majesty's chaplains in ordinary. Two years later (1861) he was raised to the episcopal bench as bishop of Gloucester and Bristol; but before he had held the appointment twelve months he was transferred to the archbishopric of York. Dr. Thomson was author of a number of works, including: *An Outline of the Necessary Laws of Thought; The Atoning Work of Christ, viewed in Relation to some Current Theories; Crime and Its Excuses; Life in Light of God's Word* (sermons); *Limits of Philosophical Inquiry; Design in Nature;* and a series of essays entitled *Word, Work and Will*. He died in 1890.

Thomson, SIR WILLIAM (Lord Kelvin), one of the greatest mathematicians and physicists, was born at Belfast, Ireland, in 1824, his father being James Thomson, professor of mathematics in Glasgow University. He was educated first at Glasgow University, and then at Peterhouse, Cambridge, where he graduated (1845) as second wrangler, and first Smith's prizeman, and was elected to a fellowship. In 1846 he was appointed professor of natural philosophy in the University of Glasgow, a post which he continued to hold. The same year he became editor of the Cambridge and Dublin *Mathematical Journal*, to which he contributed valuable papers on the mathematical theory of electricity, being also a distinguished contributor to Liouville's *Journal de Mathématiques*. Among the most important of his contributions to electrical science are the construction of several delicate instruments for the measurement and study of electricity. It is, however, in connection with submarine telegraphy that Sir William Thomson's name is most generally known, his services being rewarded, on the completion of the Atlantic cable of 1866, with knighthood and other honors.

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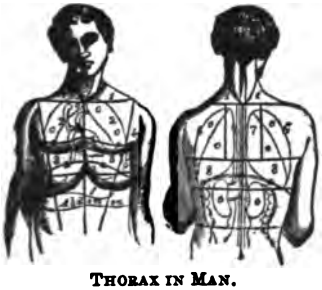
He also made important additions to our knowledge of magnetism and heat, and invented an improved form of mariner's compass now in extensive use. He was president of the British Association at its Edinburgh meeting in 1871. He was the author, jointly with Professor Tait, of a well-known treatise on natural philosophy, and issued many valuable papers. A notable theory of his, the vortex theory of atomics, attracted wide attention, but was finally abandoned by its author as mathematically undemonstrable. He was created Baron Kelvin in 1892. He died December 17, 1907.

Thor (thor, tor), son of Odin by Jörd (the earth), the Jupiter of the Teutons, the God of thunder. *Thursday* has its name from him. See *Northern Mythology*.

Thoracic Duct (tho-ras'ik). See *Lymph*.

Thorax (thō'raks), the chest, or that cavity of the human body formed by the spine, ribs, and breast-bone, situated between the neck and the abdomen, and which contains the pleura, lungs, heart, etc. The name is also applied to the corresponding portions of other mammals, to the less sharply defined cavity in the lower vertebrates, as birds, fishes, etc., and to the segments intervening between the head and abdomen in insects and other Arthropoda. In serpents and fishes the thorax is not completed below by a breast-bone. In insects three sections form the thorax, the *pro-thoræ*, bearing the first pair of legs; the *meso-thoræ*, bearing the second pair of legs and first pair of wings; and and *meta-thoræ*, bearing the third pair of legs and the second pair of wings.



THORAX IN MAN.

Thoracic regions denoted by thick black lines. 1 1, Right and left Humeral; 2 2, do. Subclavian; 3 3, do. Mammary; 4 4, do. Axillary; 5 5, do. Subaxillary or Lateral; 6 6, do. Scapular; 7 7, do. Interscapular; 8 8, do. Superior Dorsal or Subscapular.—Viscera or contents of Thorax, the position of which is indicated by dotted lines. *a a*, Diaphragm; *b*, Heart; *c*, Lungs; *d*, Liver; *e*, Kidneys; *f*, Stomach.

Thoreau (thō'rō), HENRY DAVID, writer on nature subjects, was born at Boston, Massachusetts, in 1817, and was educated at Harvard University, where he was graduated in 1837. From that time till 1840 he was engaged as a schoolmaster. Then for several years he occupied himself in various ways, in land-surveying, carpentering, and other handicrafts, but devoting a greater part of his time to study and the contemplation of nature. In 1845 he built for himself a hut in a wood near Walden Pond, Concord, Mass., and there for two years lived the life of a hermit. After quitting his solitude, Thoreau pursued his father's calling of pencil-maker at Concord, where he died in 1862. Besides contributing to the *Dial* and other periodicals, he published *A Week on the Concord and Merrimac Rivers* (1849), and *Walden, or Life in the Woods* (1854). After his death appeared *Excursions in Field and Forest*, *The Maine Woods*, *Cape Cod*, and *A Yankee in Canada*. Thoreau was a friend of Emerson, and imbibed much of his spirit and method of thought.

Thorium (thō'ri-um), the metal of which thoria is the oxide, discovered by Berzelius. It is in the form of a heavy metallic powder, has an iron-gray tint, burns in air or oxygen, when heated, with great splendor, and is converted into thorina or oxide of thorinum. It unites energetically with chlorine, sulphur, and phosphorus. Hydrochloric acid readily dissolves it, with the evolution of hydrogen gas. The symbol of Thorium is Th, and the atomic weight 116.

Thorn. See *Hawthorn*.

Thorn (tōrn), a town and strong fortress of Prussia, province of East Prussia, on the Vistula. It consists of an old and a new town, has several churches, one of them containing a statue of Copernicus, who was born here; manufactures of machinery, soap, and a famous gingerbread; some shipping, and a good trade. Pop. 29,626.

Thorn-apple. See *Datura*.

Thorn-back Ray. See *Ray*.

Thornbury (thorn'bu-ri), WALTER, a miscellaneous writer, born in London in 1828. Beginning his literary career in Bristol at the age of seventeen, he soon after settled in London, where for thirty years he was al-

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most continuously at work writing for *Household Words*, *Once a Week*, *Athenæum*, *etc.* Among his numerous works are *Shakespeare's England*, *Songs of the Cavaliers and Roundheads*, *Haunted London*, *Legendary and Historic Ballads*, and a *Life of Turner*, under the supervision of Ruskin. He died in 1876.

Thornhill (thorn'hill), SIR JAMES, an English painter, born in 1676; died in 1734. He was much engaged in the decoration of palaces and public buildings, in which his chief works are to be found. Among his best efforts may be mentioned the dome of St. Paul's, the salon and refectory at Greenwich Hospital, and some rooms at Hampton Court. His forte was in the treatment of allegorical subjects.

Throop, a borough in Lackawanna Co., Pennsylvania, 4 miles from Scranton. It has coaling interests. Pop. 5133.

Thorough-bass. See *Bass.*

Thoroughwort. See *Boneset.*

Thorpe (thorp), BENJAMIN, an English scholar who greatly furthered the study of Anglo-Saxon; born in 1782; died in 1870. Among his numerous publications are an English edition of Rask's *Anglo-Saxon Grammar*, *Ancient Laws and Institutes of the Anglo-Saxon Kings*, *The Gospels in Anglo-Saxon*, an edition of *Beowulf*, *The Anglo-Saxon Chronicle*, *Northern Mythology*, etc.

Thorpe, FRANCIS NEWTON, an American author, born in Swampscott, Massachusetts, in 1857. He is author of *The Government of the People of the United States; The Story of the Constitution; The Constitution of the United States with Bibliography; The History of the Civil War*, and numerous other works on historical and political subjects. He was professor of American Constitutional History at the University of Pennsylvania, 1895-98.

Thorwaldsen (tor'vâld-sĕn), ALBERT BARTHOLOMEW (Bertel), a celebrated sculptor, born at Copenhagen November 19, 1770. At first he helped his father to cut figureheads in the royal dockyard, then, after some years' study at the Academy of Arts, he won the privilege of studying three years abroad. Going to Rome (1797) he was much impressed by the works of Canova, the sculptor, and Carstens, the painter, who were then residing there. It was not until 1803, however, that he became at all widely known. Then by a lucky chance he received a commission from Sir Thomas Hope to execute in marble a statue of Jason, which the sculptor had modeled. This was so brilliantly executed that commissions flowed in upon him, new creations from his hand followed in quick succession, and his unsurpassed abilities as a sculptor became everywhere recognized. In 1819 he returned to Denmark, and his journey through Germany and his receptions at Copenhagen resembled a triumph. After remaining a year in Copenhagen and executing various works there, he returned to Rome, visiting on his way Berlin, Dresden, Warsaw and Vienna. He remained at Rome till 1838, when he undertook another journey to Copenhagen, being principally moved to this step by the contemplated establishment in that city of a museum of his works and art treasures. His return was a sort of national festival. The remainder of his life was spent chiefly in the Danish capital, where he died March 24, 1844. The Thorwaldsen Museum, opened in 1846, contains about 300 of the works of the sculptor. Thorwaldsen was eminently successful in his subjects chosen from Greek mythology, such as his *Mars*, *Mercury*, *Venus*, *etc.* His religious works, among which are a colossal group of *Christ and the Twelve Apostles*, *St. John Preaching in the Wilderness*, and statues of the four great prophets, display almost superior grandeur of conception. Chief among his other works are his statues of *Galileo* and *Copernicus*, and the colossal lion near Lucerne, in memory of the Swiss guards who fell in defense of the Tuileries.

Thoth (thoth, tōt), an Egyptian deity identified by the Greeks with Hermes (Mercury), to whom was attributed the invention of letters, arts, and sciences. The name is equivalent in significance to the Greek Logos, and Thoth is a mythical personification of the divine intelligence.

Thou (tō), JACQUES AUGUSTE DE, a French statesman and historian, born in 1553; died in 1617. Henry IV employed him in several important negotiations, and in 1593 made him his principal librarian. In 1595 he succeeded his uncle as chief-justice, and during the regency of Mary de' Medici he was one of the directors-general of finance. His greatest literary labor was the composition in Latin of a voluminous *History of My Own Times*, comprising the events from 1545 to 1607, of which the first part was made public in 1604. To this work, which is remarkable for its impartiality, he subjoined interesting *Memoirs* of his own life.

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Thought-reading. See *Telepathy.*

Thourout (tō-rō), a town of Belgium, in the province of West Flanders, with various manufactures and a large trade. Pop. 10,146.

Thousand and One Nights. See *Arabian Nights.*

Thousand Islands, a group of small islands, which really number about 1800, in the St. Lawrence immediately below Lake Ontario. They partly belong to Canada and partly to the State of New York, and have become a popular summer resort.

Thrace (thrās), or THRACIA, a name applied at an early period among the Greeks to a region lying north of Macedonia. By the Romans this country was regarded as divided into two parts by the Hæmus (or Balkan), the northern of which was called Mœsia and the southern Thrace. The Greeks early settled colonies on the coasts, and the country, besides possessing rich meadows and corn-lands, abounded in mines, while the Thracian horses and riders rivaled those of Thessaly. Of the rivers of Thrace, the largest and most celebrated was the Hebrus (now Maritza). Abdera, the birthplace of Democritus and Protagoras; Sestos, on the Hellespont, celebrated in the story of Hero and Leander; and Byzantium, on the peninsula on which Constantinople now stands, were the places the most worthy of note.

Thrashing-machine, a machine for separating grain from the straw, and in which the moving power is that of horses, oxen, wind, water, or steam. The thrashing-machine was invented in Scotland in 1758 by Michael Stirling, a farmer in Perthshire; it was afterwards improved by Andrew Meikle, a millwright in East Lothian, about the year 1776. Since that time it has undergone various improvements. The principal feature of the thrashing-machine as at present constructed, is the three rotary drums or cylinders, which receive motion from a water-wheel, or from horse or steam power. The first drum which comes into operation has projection ribs called beaters on its outer surface, parallel to its axis. This drum receives a very rapid motion on its axis. The sheaves of grain are first spread out on a slanting table, and are then drawn in with the ears foremost between two feeding rollers with parallel grooves. The beaters of the drum act on the straw as it passes through the rollers, and beat out the grain. The thrashed straw is then carried forward to two successive drums or *shakers*, which, being armed with numerous spikes, lift up and shake the straw so as to free it entirely from the loose grain lodged in it. The grain is made to pass through a grated floor, and is generally conducted to a winnowing-machine connected by gearing with the thrashing-machine itself, by which means the grain is separated from the chaff. Improved machines on the same principle, many of them portable, are extensively used in the United States and Britain, those of the former country being particularly light and effective. In American thrashers two modes are employed for separating the straw from the grain; the 'endless aprons' answer an excellent purpose when not driven too rapidly, and make clean work. The 'vibrator' consists of a series of inclined fingers, the rapid shaking motion of which tosses up the straw and shakes out the grain; to the machine is attached a measuring hopper, showing the quantity of grain passing through it. Another machine for thrashing rye carries the straw through unbroken, for binding in bundles. The portable steam thrashing-machine, moved from farm to farm, may perform the thrashing-work of a wide district for the whole season.

Thrasimene (or TRASIMENUS), LAKE. See *Perugia, Lago di.*

Thread (thred), a slender cord consisting of two or more yarns, or simple spun strands, firmly united together by twisting. The twisting together of the different strands or yarns to form a thread is effected by a thread-frame or doubling and twisting machine, which accomplishes the purpose by the action of bobbins and flyers. Thread is used in some species of weaving, but its principal use is for sewing.

Thread-worms, the name for thread-like intestinal worms of the order Nematoda. The *Oxyuris vermicularis* occurs in great numbers in the rectum of children particularly. See *Nematelmia.*

Three Rivers, a city of St. Joseph Co., Michigan, on the St. Joseph River, 25 miles S. of Kalamazoo. Manufactures cars, railroad supplies, electric motors, furniture, tools, pulleys, paper, etc. Pop. 5072.

Three Rivers, or TROIS RIVIÈRES, a town and port of entry of Quebec, Canada, 95 miles N. E. of Montreal, at the confluence of the rivers St. Maurice and St. Lawrence. It has an extensive trade in timber, and important manufactures of ironware, and is

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one of the oldest towns in the province, being founded in 1634. It is the residence of a Roman Catholic bishop, and contains a cathedral. Pop. 9981.

Thresher-shark, also called the FOX-SHARK, a genus of sharks containing but one known species (*Alopias vulpes*), with a short conical snout, and less formidable jaws than the white shark. The upper lobe of the tail fin is very elongated, being nearly equal in length to the rest of the body, and is used as a weapon to strike with. Tail included, the thresher attains a length of 13 feet. It inhabits the Atlantic and the Mediterranean. See *Shark.*

Thrift. See *Sea-pink.*

Thrips, a genus of minute insects, order Hemiptera, suborder Homoptera, closely allied to the Aphides. They are extremely agile, and seem to leap rather than fly. They live on flowers, plants, and under the bark of trees. *T. cerealium* is a common species, scarcely a line in length or in extent of wing, residing in the spathes and husks of cereals, especially wheat, to which it is most injurious.

Throat (thrōt), the anterior part of the neck of an animal, in which are the œsophagus and windpipe, or the passages for the food and breath. See *Larynx, Œsophagus, Trachea, Diphtheria, Croup,* etc.

Thrombosis (throm-bō'sis), the formation of a clot in the heart or a blood-vessel which may block the vessel, causing serious results.

Throstle. See *Thrush.*

Thrush, the name applied popularly to several insessorial birds. The true thrushes (*Turdidæ* or *Merulidæ*) form a family of dentirostral passerine birds, including the song-thrush or throstle, the missel-thrush, the blackbird, etc. They feed upon berries, small molluscs, worms, etc. Their habits are mostly solitary, but several species are gregarious in winter. They are celebrated on account of their powers of song; and are widely diffused, being found in all the quarters of the globe. Nine species of the thrush family are found in the United States. These include the wood thrush, found east of the Mississippi and south to Guatemala, the liquid, half plaintive notes of which excel in sweetness those of any other American bird. The notes are few in number, but possess a charm beyond description. The common robin also is a member of the thrush family. There are several European species, among which are included the missel thrush and the song thrush of Britain. These are also sweet singers.

Thrush, a disease common in infants who are ill fed. (See *Aphthæ.*) The name is also applied to an abscess in the feet of horses and some other animals.

Thua'nus. See *Thou.*

Thucydides (thō-sid'i-dēz), the greatest of all the Greek historians, was born in Attica about 471 B.C. He was well born and rich, being the possessor of gold mines in Thrace, and was for a time a prominent commander during the Peloponnesian war, which forms the subject of his great work. For many years he suffered exile (being accused of remissness in duty); but appears to have returned to Athens the year following the termination of the war, namely in B.C. 403. He is said to have met a violent death, probably a year or two later, but at what exact time, and whether in Thrace or Athens, is not known. His history consists of eight books, the last of which differs from the others in containing none of the political speeches which form so striking a feature of the rest, and is also generally supposed to be inferior to them in style. Hence it has been thought by various critics to be the work of a different author, of Xenophon, of Theopompus, or of a daughter of Thucydides; but it is more probable that it is the author's own without his final revision. The history is incomplete, the eighth book stopping abruptly in the middle of the twenty-first year of the war. As a historian Thucydides was painstaking and indefatigable in collecting and sifting facts, brief and terse in narrating them. His style is full of dignity and replete with condensed meaning. He is unsurpassed in the power of analyzing character and action, of tracing events to their causes, of appreciating the motives of individual agents, and of combining in their just relations all the threads of the tangled web of history. The best translations are by Jowett and Dale.

Thugs, the name applied to a secret and once widely-spread society among the Hindus, whose occupation was to waylay, assassinate, and rob all who did not belong to their own caste. This they did, not so much from cupidity as from religious motive, such actions being deemed acceptable to their goddess Kâlî. The government first took active measures against them in 1831 and 1835, and Thuggery is now practically extinct.

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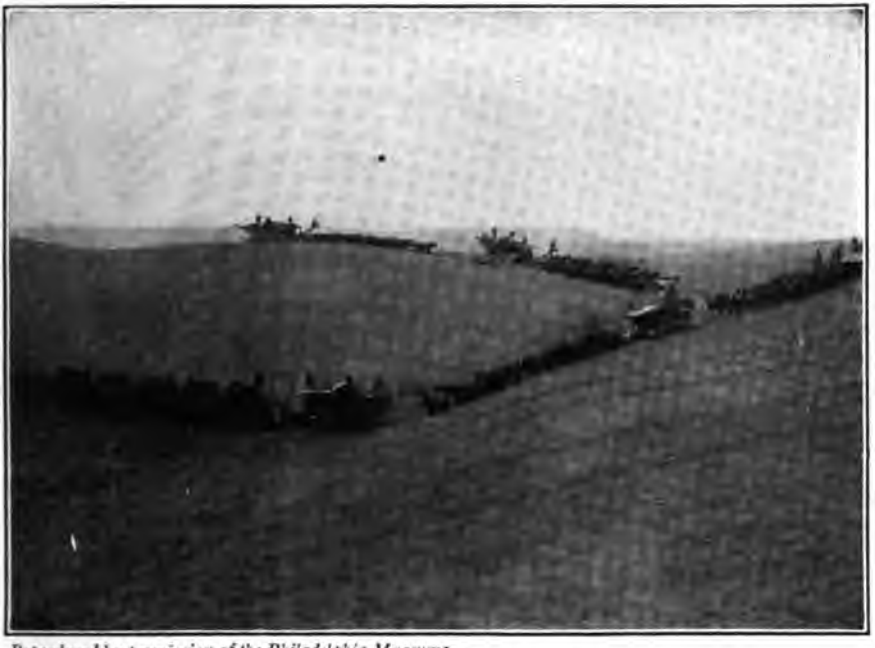

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HARVESTING IN THE WEST

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STEAM HARVESTER AND THRESHER

The upper view shows side hill harvesters drawn by teams of twenty-eight horses each. The machines cut the grain, and tie it up in bundles, which are dropped outside. The machine in the lower view is self-propelling, cuts and threshes the grain, throwing out the straw, and places the grain in sacks ready for loading on the wagon.

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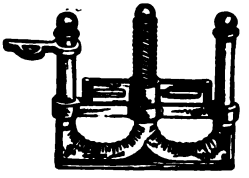
Thuja. See *Arbor Vitæ.*

Thule (thō'le), the name given by the ancients to the most northern country with which they were acquainted. According to Pytheas it was an island six days' voyage to the north of Britannia, and accordingly it has often been identified with Iceland. Some have imagined it to be one of the Scotch islands, others the coast of Norway.

Thumb-screw, a former instrument of torture for compressing the thumbs. It was employed in various countries, Scotland in particular. Called also *Thumbkins.*



Scotch Thumb-Screw, time of Charles I.

Thun (tön), a town of Switzerland, in the canton of Bern, beautifully situated at the northwestern extremity of the lake of its own name, at the point where the Aar issues from it. It is the seat of the Swiss military school, and the chief place of arms in the country. Pop. 6069.—The lake is 10 miles long, 2 broad, and about 720 feet deep. At its southeastern extremity it receives the surplus waters of the Lake of Brienz by the Aar, which again emerges from its northwestern extremity.

Thunder. See *Lightning.*

Thunder-fish, a species of fish of the family Siluridæ, found in the Nile, which, like the torpedo, can give an electric shock. It is the *Malapterūrus electricus* of naturalists.

Thundering Legion. See *Aurelius Antoninus.*

Thurgau (tur'gou), a canton in the northeast of Switzerland, bounded mainly by the Lake of Constance and the cantons of Zürich and St. Gall; area, 381 square miles; capital Frauenfeld. It differs much in physical conformation from most other Swiss cantons, in having no high mountains, though the surface is sufficiently diversified. The whole canton belongs to the basin of the Rhine, to which its waters are conveyed chiefly by the Thur and its affluents, and partly also by the Lake of Constance, including the Untersee. The principal crops are grain and potatoes; large quantities of fruit are also grown. In many places the vine is successfully cultivated. The manufactures consist chiefly of cottons, hosiery, ribbons, lace, etc. Pop. 113,221.

Thurible (thū'ri-bl), a kind of censer of metal, sometimes of gold or silver, but more commonly of brass or latten, in the shape of a covered vase or cup, perforated so as to allow the fumes of burning incense to escape. It has chains attached, by which it is held and swung at high mass, vespers, and other solemn offices of the Roman Catholic Church.

Thurible.

Thüringerwald (tü'ring-ėr-vâlt), or FOREST OF THURINGIA, a mountain chain in the center of Germany, stretching southeast to northwest for about 60 miles. Its culminating points are the Beerberg and the Schneekopf, which have each a height of about 3220 feet. The mountains are well covered with wood, chiefly pine. The minerals include iron, copper, lead, cobalt, etc.

Thuringia (thō-rin'ji-a; German, *Thüringen,* tü'ring-ėn), a region of Central Germany situated between the Harz Mountains, the Saale, the Thüringerwald, and the Werra, and comprising great part of Saxe-Weimar, Saxe-Coburg-Gotha, and other small adjoining states.

Thurles (thur'les), a town in Ireland, in the county of Tipperary, on both banks of the Suir, with considerable trade, a Roman Catholic cathedral and college, etc. Pop. 4411.

Thurlow (thur'lō), EDWARD, LORD, lord-chancellor of England, was born at Little Ashfield, near Stowmarket, Suffolk, in 1732, and in 1778 was made lord-chancellor, being raised to the peerage as Baron Thurlow. Pitt suspected Thurlow of intriguing with the Prince of Wales, and from this time an open disagreement took place between them. Pitt demanded his dismissal, to which the king at once agreed, and he was deprived of the great seal in June, 1792. He died in 1806.

Thurman (thur'man), ALLEN GRANBERY, statesman, born at Lynchburg, Virginia, in 1813. He entered Congress in 1845, and was elected to the supreme bench of Ohio in 1851, occupying the position of chief-justice. Ohio sent him to the United States Sen-

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ate in 1869, where he became the recognized leader of the Democratic party. He was the author of the act to compel the Pacific railroad corporations to fulfil their obligations, known as 'the Thurman act.' In 1888 he received the nomination of the Democratic party for the vice-presidency, but was defeated. He was called 'the old Roman' because of his special devotion to the Republic. He died December 12, 1895.

Thursday (thurz'dā; that is, 'Thor's day'), the fifth day of the week, so called from the old Teutonic god of thunder, Thor. See *Thor*.

Thursday Island, a small island of Queensland, in Normanby Sound, Torres Straits. It is a government station, and the harbor — Port Kennedy — is one of the finest in this quarter. It is in the direct tract of all vessels reaching Australia by Torres Straits; is the center of a large and important pearl and bêche-de-mer fishery; and is a depôt of trade with New Guinea.

Thurso (thur'sō), a seaport of Scotland, in the county of Caithness, on the shore of the bay of the same name. The chief trade is the exportation of grain, cattle, agricultural produce and excellent paving-stones. Pop. 3723.

Thurston (thurs'tun), Robert Henry, physicist, was born at Providence, Rhode Island, in 1839; died in 1903. He graduated at Brown University in 1859; served in the navy during the Civil war; became assistant professor of natural philosophy at the Naval Academy in 1865, professor of mechanical engineering at the Stevens Institute in 1871, and director of Sibley College, Cornell University, in 1884. His experiments and inventions were of great value to his profession. He wrote *History of the Growth of the Steam Engine, Friction and Lubrication, Materials of Engineering*, etc.

Thyestes (thī-es'tēz), in Greek mythology, son of Pelops and Hippodamia, and grandson of Tantalus. Having seduced the wife of his brother Atreus, the latter, in revenge, served up to him the body of his own son at a feast. See *Atreus*.

Thylacine (thil'a-sēn; *Thylacinus cynocephălus*), a carnivorous marsupial animal inhabiting Tasmania, and commonly known as the Tasmanian wolf. In size it is generally about 4 feet in total length, though some specimens attain a much greater size. It is nocturnal in its habits; of a fierce and most determined disposition, and is very destructive to sheep and other animals. It has an elongated and somewhat dog-like muzzle, and a long tapering tail; the fur is grayish-brown with a series of bold transverse stripes, nearly black in color, beginning behind the shoulders and ending at the tail.

Thylacoleo (thil-a-kō'le-ō), a remarkable extinct carnivorous marsupial, whose bulk and proportions appear to have equaled the lion. Its fossil remains are found in Australia.

Thyme (tīm; *Thymus vulgāris*), a small plant of the nat. order Labiatæ, a native of the south of Europe, and frequently cultivated in gardens. It is from 6 to 10 inches high, with narrow, almost linear leaves, and whitish or reddish flowers; has a strong aromatic odor, and yields an essential oil, which is used for flavoring purposes. The fragrant wild thyme found in several of the United States is the *Thymus Serpyllus* of botanists. Both species afford good bee-pasture.

Thymelaceæ (thī-me-lā'se-ē), the Daphne family, an order of exogenous plants, consisting of shrubs or small trees, rarely herbs, with non-articulated, sometimes spiny branches, with tenacious bark. The leaves are alternate and opposite, and the flowers spiked and terminal. The fruit is nut-like or drupaceous. The species are not common in Europe; they are found chiefly in the cooler parts of India and South America, at the Cape of Good Hope and in Australia. See *Daphne* and *Lace-bark Trees*.

Thymus Gland (thī'mus), a ductless temporary organ situated in the middle line of the body. After the end of the second year of life it decreases in size, and almost or wholly disappears at puberty. It is covered in front by the breast-bone, and lies on the front and sides of the windpipe. Its functions are still undetermined.

Thyroid Cartilage. See *Larynx*.

Thyroid Gland (thī'roid), a ductless structure in man which covers the anterior and inferior part of the larynx and the first rings of the windpipe. It is of a reddish color, and is more developed in women than in men. It may become abnormally enlarged, as in *goitre*. Its use is not at all clear, but it probably exerts some influence on the blood and circulation, especially in childhood.

Thyrsus (thir'sus), among the Greeks, a wand or spear wreathed with ivy leaves, and with a pine-cone at the top, carried by the followers of Bacchus as a symbol of devotion. In an-

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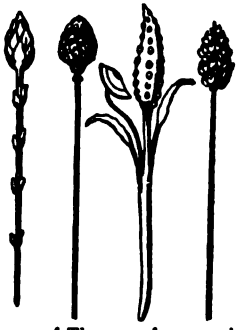
cient representations it appears in various forms.



Various forms of Thyrsus, from ancient Vases.

Thysanura (this'a-nū'ra; 'fringe-tailed'), an order of apterous insects that undergo no metamorphosis, and have, in addition to their feet, particular organs of motion, generally at the extremity of the abdomen. The group is often divided into two families, Poduridæ or spring-tails, and Lepismidæ or sugar-lice, etc. Recently it has been divided into two orders by Sir John Lubbock: 1. Collembōla, comprising those members known as spring-tails, and nearly co-equal with the Poduridæ; 2. Thysanura (restricted), comprising those whose anal bristles do not form a spring, as the Lepismidæ. See *Poduridæ*, *Lepismidæ*.

Tiara (ti-ā'ra), originally the cap of the Persian kings. The tiara of the pope is a high cap, encircled by three coronets with an orb and cross of gold at the top, and on two sides of it a chain of precious stones. The miter alone was first adopted by Damasus II in 1048. It afterwards had a plain circlet of gold put round it. It was surmounted by a coronet by Boniface VIII. The second coronet was added by Benedict XII, the third coronet by Urban V.

Tibbus (tib'us), a people of the Eastern Sahara, probably allied in race to the Berbers.

Tiber (ti'ber; Italian, *Tevĕre*; anciently, *Tiberis*), a celebrated river of Italy, which rises in the Apennines, in Tuscany, and, after a general southerly course of about 240 miles, falls into the Mediterranean by two mouths (one of them artificial). It traverses the city of Rome, here forming the island anciently called Insula Tiberina. About ninety miles of its course are navigable for small vessels; those of about 140 tons burden reach Rome. It is subject to floods, and carries down quantities of yellowish mud, hence its designation 'the yellow Tiber.' See *Rome*.

Tibe'rias. See *Galilee, Sea of*.

Tiberius (ti-bē'ri-us), in full, TIBERIUS CLAUDIUS NERO CÆSAR, a Roman emperor, born B.C. 42, was the son of Tiberius Claudius, of the ancient Claudian family, and of Livia Drusilla, afterwards the wife of the emperor Augustus. Tiberius became consul in his twenty-eighth year, and was subsequently adopted by Augustus as his heir. In A.D. 14 he succeeded to the throne without opposition. Dangerous mutinies broke out shortly afterwards in the armies posted in Pannonia and on the Rhine, but they were suppressed by the exertions of the two princes, Germanicus and Drusus. The conduct of Tiberius as a ruler was distinguished by an extraordinary mixture of tyranny with occasional wisdom and good sense. Tacitus records the events of the reign, including the suspicious death of Germanicus, the detestable administration of Sejanus, the poisoning by that minister of Drusus, the emperor's son, and the infamous and dissolute retirement of Tiberius (A.D. 27) to the Isle of Capreæ, in the Bay of Naples, never to return to Rome. The death of Livia in A.D. 29 removed the only restraint upon his actions, and the destruction of the widow and family of Germanicus followed. Sejanus, aspiring to the throne, fell a victim to his ambition in the year 31; and many innocent persons were destroyed owing to the suspicion and cruelty of Tiberius, which now exceeded all limits. He died in March, 37.

Tibesti (tē-bes-tē'), a region of the Eastern Sahara, supporting a scanty population of the Tibbu race.

Tibet, or THIBET (ti'bet, ti-bet'), a country occupying the south portion of the great plateau of Central Asia, lying between lon. 73° and 101° E., and lat. 27° and 36° N., and extending east and west from Cashmere and the Karakorum range to the frontiers of China; area about 700,000 sq. miles. Its plains average about 10,000 feet in height, and many of its mountains have twice that altitude. In Tibet nearly all the great rivers of South and East Asia take their rise (Indus, Brahmaputra, Hoang-ho, Yang-tse-kiang, etc.), and there are numerous salt and freshwater lakes, situated from 13,800 to 15,000 feet above the sea-level. The climate is characterized by the excessive dryness of

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the atmosphere, and the severity of the winter. From October to March vegetation is almost wholly dried up, and the cold is intense. Notwithstanding the inclemency of the weather there is a great abundance of wild and domestic animals. Of these the most remarkable is the yak, which exists both wild and domesticated. It supplies food and clothing, and is also used as a beast of burden. Other animals include the musk-deer, the Cashmere goat, wild sheep, wild horses and fat-tailed sheep. Agriculture is practiced to a comparatively small extent, suitable localities being rare. Minerals include gold, copper, iron, borax and rock-salt. Tibet does a large trade with China, exchanging gold-dust, incense, idols and European and Indian goods, for tea, silks and other Chinese produce. The capital is Lhasa. The form of government is a hierarchy. The religion is Buddhism in a form known as Lamaism (which see), of which Tibet is the principal seat. The *lamas* or priests form a large proportion of the population, and live in monasteries; the two grand lamas being regarded as the religious and political heads of the state. Remains of an earlier creed exist in the Boupo, a religion evolved from Shamanism, but much influenced by Buddhism, and frequently confounded with the old school of the Buddhists. The inhabitants are of an amiable disposition, but much averse to intercourse with foreigners, few of whom have been able to gain admittance to the country. Recently, however, the country has been traversed by persistent explorers and its general characteristics learned. The manners and mode of life of the people are rude. Polyandry is a common custom. The language is allied to Chinese, and has been written and used in literature for 1200 years. Tibet was governed by its own princes till the commencement of the 18th century, but since 1720 it has been a dependency of China. A Chinese functionary is always stationed at the residence of the grand lama, and a Chinese governor with a military force is stationed in each of the principal towns. A recent event was the sending of a Chinese force to the country to seize the Dalai Lama, who was suspected of ambitious views, and who fled to India, putting himself under British protection. The population is estimated at from 2,000,000 to 3,000,000, though by some it is supposed to be considerably larger.

Tibia (tib'i-a), a kind of pipe, the commonest musical instrument of the Greeks and Romans. It had holes at proper intervals, and was furnished with a mouthpiece. For the tibia in anatomy see *Leg*.

Tibullus (ti-bul'us), ALBIUS, a Roman elegiac poet, who belonged to the equestrian order, and died in the flower of his age, about B. C. 18. His poems are among the most perfect of their kind, but their moral tone is that of a reckless voluptuary. We possess four books of elegies under his name, but the third and part of the fourth are spurious.

Tic Douloureux (dō'lō-rē), a painful affection of a facial nerve, a species of neuralgia. It is characterized by acute pain, attended with convulsive twitchings of the muscles, and continuing from a few minutes to several hours. It occurs on one side of the face, and may be caused by a diseased tooth, by inflammation in the ear passage, by exposure to cold, by dyspepsia, etc. The removal of the cause is the natural remedy; and warm applications, the employment of electric currents over the nerve, and morphia administered subcutaneously, are sometimes efficient.

Ticino (ti-chē'nō; German and French, *Tessin*), a river of Switzerland and North Italy, which rises in Mount St. Gothard, and after a course of about 120 miles joins the Po on the left. It traverses Lake Maggiore and separates Piedmont from Lombardy.

Ticino (German and French, *Tessin*), a canton in the south of Switzerland; area, 1088 square miles. The northern and greater part of this canton is an elevated and mountainous region, the Splügen, St. Bernardin, and Mount St. Gothard forming its northern boundary. The chief river is the Ticino, and there are numerous small lakes. Lake Maggiore is partly within the canton. In the north the principal occupations are cattle-rearing and the preparation of dairy produce. In the south the olive, vine, figs, citrons, and pomegranates are grown. Manufactures and trade are unimportant. The chief towns are Bellinzona, Locarno, and Lugano. Pop. 138,638, most of whom are Catholics and speak Italian.

Tickell (tik'el), THOMAS, an English man of letters, born in Cumberland in 1686. His success in literature and in life was mainly due to Addison, who procured for him in 1717 an under-secretaryship of state. In 1725 he was appointed secretary to the lords-justices of Ireland, a post he held till his death in 1740. His chief works are *Prospect of Peace*, a ballad entitled *Colin and Lucy*, and a fine elegy on the death of Addison.

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Ticket-of-leave, a certificate given to a convict by which he is permitted to go at liberty, under certain restrictions, before the expiration of his sentence. This system exists in Britain and a similar system, known as parole, has recently been adopted in parts of the United States. It amounts to a conditional pardon, dependent upon the conduct of the prisoner.

Ticking (tik'ing), a strong cloth, commonly made of twilled linen or cotton and of a striped pattern. It is chiefly used for covering mattresses for beds.

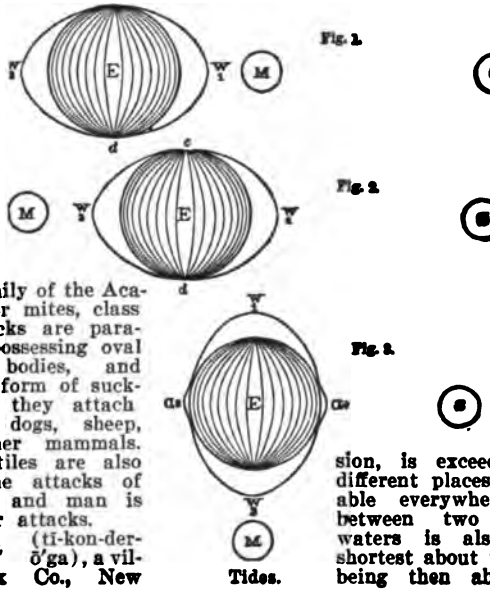
Ticknor (tik-nur), GEORGE, historian, born at Boston in 1791; died there in 1871. He was graduated from Dartmouth College in 1807, and was admitted to the bar in 1813. In 1815 he embarked for Europe, and visited the chief capitals for the purpose of pursuing his studies. On his return in 1820 he was appointed professor of modern languages and literature in Harvard University. In 1835 he resigned his professorship, and for the next three years traveled in Europe with his family. In 1849 he published a *History of Spanish Literature*, corrected and enlarged editions being subsequently published. It was at once recognized by scholars as a work of value, and has been translated into Spanish and German. After completing some works of minor interest he produced, in 1863, a *Memoir of Prescott*, the historian, with whom he had long maintained a close friendship.

Ticks, a family of the Acarida or mites, class Arachnida. Ticks are parasitic animals, possessing oval or rounded bodies, and mouths, in the form of suckers, by which they attach themselves to dogs, sheep, oxen, and other mammals. Birds and reptiles are also annoyed by the attacks of certain species and man is subject to their attacks.

Ticonderoga (tī-kon-der-ō'ga), a village in Essex Co., New York, situated upon the stream connecting lakes George and Champlain. It figured prominently during the colonial and revolutionary period, having a fortress built by the French in 1755, which was attacked by the British in 1758 and captured by Ethan Allen in 1775. The ruins of the old fort remain an object of interest. Pop. 2475.

Tidal Motor, a motive power receiving its energy through the lift and fall of the tides acting upon a suitable apparatus.

Tide (tīd), the rising and falling of the water of the sea, which occurs periodically, as observed at places on the coasts. The tide appears as a general wave of water, which gradually elevates itself to a certain height, then as gradually sinks till its surface is about as much below the medium level as it was before above it. From that time the wave again begins to rise; and this reciprocating motion of the waters continues constantly, with certain variations in the height and in the times of attaining the greatest degree of height and of depression. The alternate rising and falling of the tide-wave are observed to take place generally twice in the course of a lunar day, or of 24 hours 49 minutes of mean solar time, on most of the shores of the ocean, and in the greater part of the bays, firths, and rivers which communicate freely with it. The tides form what are called a *flood* and an *ebb*, a *high* and *low water*. The whole interval between high and low water is often called a *tide;* the water is said to *flow* and to *ebb;* and the rising is called the *flood-tide* and the falling the *ebb-tide*. The rise or fall of the waters, in regard to elevation or depression, is exceedingly different at different places, and is also variable everywhere. The interval between two succeeding high-waters is also variable. It is shortest about new and full moon, being then about 12 hours 19



Tides.

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minutes; and about the time of the moon's quadratures it is 12 hours 30 minutes. But these intervals are somewhat different at different places. Tides are caused by the attraction which the sun and moon exert over the water of the earth. The moon is the nearest of the heavenly bodies to the earth, and the mobile nature of water leads it to yield readily to the attractive influence. Those parts of the waters directly under the moon's vertical path in the heavens are drawn out towards the moon. At the same time the moon attracts the bulk of the earth, and, as it were, pulls the earth away from the water on the surface furthest from it, so that here also the water is raised, although not quite so much as on the nearer side. The waters being thus heaped up at the same time on these two opposite parts of the earth, and the waters situated half-way between them being thus necessarily depressed, two *high* and two *low tides* occur in the period of a little more than one revolution of the earth on its axis. The sun's influence upon the tides is evidenced in its either increasing or diminishing the lunar tide, according as the sun's place in the heavens coincides with the line of the moon's attraction, or the reverse. It is this difference which produces what are known as *spring* tides and *neap* tides. Spring tides occur at new and full moon, and are the result of the gravitating influence of both sun and moon; neap tides occur when the moon is in her quarters, and are not so high as the spring tides, the lunar influence being lessened by the sun's force acting in a direction at right angles to it. The accompanying figures illustrate the theory of the tides, E being the earth, M the moon, S the sun, W_1 W_2 the water raised up by attraction on the opposite sides of the earth. Fig. 1 shows spring tide at new moon, fig. 2 spring tide at full moon, the low tides being at *c* and *d*. Fig. 3 illustrates the neap tides, a_1 a_2 being small tides caused by the sun alone. The interference of coasts and irregularities in the ocean beds cause the great variations as to time and range in the actual tides observed at different places. In some places, as in the German Ocean at a point north of the Straits of Dover, a high tide meets low water, and thus maintains perpetual mean tide. In the case cited high water transmitted through the Straits of Dover encounters low water transmitted round the north of Scotland, and *vice versa*. The interval of time at any place between noon and the time of high water on the day of full or new moon is called the *establishment of the port*. The height of the tide differs greatly in different localities. In the Pacific Ocean it is generally small, frequently not exceeding two feet. It is much higher in the contracted waters of the British coast than in the open waters of American ports. In bays, where the inflowing waters are lifted through contraction, the tides are necessarily high, and this is especially the case in the long and narrow Bay of Fundy, where the tides are exceptionally high, rising from 50 to 70 feet, while the rush of water into and out of the bay is very rapid.

Tidore (tī'dōr), one of the Moluccas (which see).

Tieck (tēk), LUDWIG, a German writer, born at Berlin in 1773. He was educated at the University of Halle, and at Göttingen and Erlangen, and having returned to Berlin came forward as a writer of tales and romances, including his tale of *Abdallah*, and a novel entitled *William Lovell*. His *Peter Lebrecht, a History without Adventures*, and *Peter Lebrecht's Volksmärchen* displayed great imaginative power and rich humor. At Jena in 1799–1800 he entered on friendly relations with the Schlegels, Novalis, Brentano, and others, and through this association arose what has been denominated as 'the Romantic School of Germany.' In 1799 he published *Romantische Dichtungen*, and in 1804 appeared his comedy *Kaiser Octavianus*. His *Phantasus*, however, gave the first sign of his having freed himself from the mysticism and extravagance of his earlier works. In 1817 he visited England, where he collected material for his *Shakespeare;* and on his return resided at Ziebingen till 1819, when he removed to Dresden. From this period his writings, as exemplified in his *Tales*, bear the true stamp of genius. These tales were ultimately published complete in twelve volumes (Berlin, 1853), the principal being *Dichterleben* ('A Poet's Life — Shakespeare'); *Der Tod des Poeten* ('The Poet's Death — Camoens'); the *Witches' Sabbath;* and *Aufruhr in den Cevennen* ('Revolt in the Cevennes'), an incomplete work. In 1826 he published his *Dramaturgische Blätter*. His study of Shakespeare resulted in *Shakespeare's Vorschule*, and the continuation of the German translation of Shakespeare commenced by Schlegel. His last story of importance was *Vittoria Accorombona* (1840). On the accession of Friedrich William IV Tieck was invited to the Prussian court in 1841, invested with a considerable pension and the rank of a privy-councilor, and thenceforward acted as a sort of supervisor of the Prussian

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stage. He died at Berlin on April 28, 1853.— His brother, CHRISTIAN FRIEDRICH (born in 1776; died in 1851), was celebrated as a sculptor.

Tiel (tēl), a town in Holland, in the province of Gelderland, 19 miles W. S. W. of Arnhem, on the right bank of the Waal. It carries on a considerable general trade. Pop. 10,788.

Tientsin (tē-en-tsēn'), a town in the north of China, and the river-port of Pekin, 70 miles away, and with which it communicates by the Pei-ho River and by a railway line. The Pei-ho is navigable only by native craft, and large vessels have their cargoes transshipped outside the mouth of the Taku roadstead. A large import trade is carried on, chiefly in European goods (Tientsin being one of the treaty ports). The principal imports are cottons, sugar, opium, paper, and tea; exports, dates, cotton, camel's wool, and coal. The Taku forts were taken by the British and French in 1860, and the capture of Pekin followed. Since then the defenses of the Pei-ho have been immensely strengthened. The city is surrounded by a lofty wall with towers and presents a mean appearance by its great expanse of low houses. The foreign quarter, however, which is outside the main city, is well built. Pop. estimated at about 800,000.

Tierra del Fuego (tē-er'a del fwā'-gō; 'Land of Fire'), a large group of islands at the southern extremity of South America, separated from the mainland by the Strait of Magellan. It consists of one large island and numerous smaller islands, with a total area of about 32,000 square miles. The eastern part of the group belongs to the Argentine Republic, the western part to Chile. These islands consist chiefly of mountains covered with perpetual ice and snow, or clothed with stunted forests, mainly evergreen-beech. The climate is wretched. The natives in the northeast resemble the Patagonians in color, stature, and habits; but those in the southeast are short and stunted, unclean in their habits, and pass a most degraded existence. Tierra del Fuego was discovered by Magalhaens (Magellan) in 1520, and named 'Land of Fire' from the numerous fires he saw on its coast during the night.

Tiers-état (ti-ār-zā-tā; 'third estate'), the name given in the ancient French monarchy to the third order of the nation, which, together with the nobility and clergy, formed the *états généraux* (states-general). It consisted of the deputies of the *bourgeoisie*, that is, the free inhabitants of the towns and communes who did not belong to either of the other two estates. In 1789 the states-general, or rather the *tiers-état* by itself, assumed the name of the National Assembly.

Tiffany (tif'a-ni), LOUIS COMFORT, American artist and art manufacturer, born in New York City in 1848. In 1880 he began to devote himself almost entirely to the production of decorative glass. The *Favrile* glass, which he discovered, is favorably known in both Europe and America.

Tiffin (tif'in), a city, capital of Seneca co., Ohio, is situated on the Sandusky River, 40 miles S. E. of Toledo. It is the seat of Heidelburg University and the college of Ursuline Sisters. Natural gas and oil are produced and it is the shipping point for large quantities of wheat and corn. The manufactures include stock food, chemicals, grain, coal, woolen goods, farming implements, emery-wheels, pottery, glass, well-drilling machinery, etc. Pop. 13,217.

Tiflis (tif-lis), capital of Russian Caucasia. Manufactures include cotton and silk, leather, soap, etc. The artisans of Tiflis are celebrated as silversmiths, gunsmiths, and sword makers. Pop. 303,150.—The government has an area of 17,000 sq. miles; produces cereals, fruits, etc. Pop. 1,000,000.

Tiger (tī'ger; *Felis tigris* or *Tigris regālis*), a well-known carnivorous animal, possessing, in common with the lion, leopard, etc., five toes on the front feet and four on the hinder feet, all the toes being furnished with strong retractile claws. The tiger is about the height of the lion, but the body is longer and the head rounder. It is of a bright fawn-color above, a pure white below, irregularly crossed with black stripes. The tiger is an Asiatic animal, attaining its full development in India, the name of 'Bengal tiger' being generally used as synonymous with those specimens which appear as the typical and most powerful representatives of the species. The tiger also occurs in Java and Sumatra. In habits it is far more active and agile than the lion, and exhibits a large amount of fierce cunning. It generally selects the neighborhood of watercourses as its habitat, and springs upon the animals that approach to drink. 'Man-eaters' are tigers which have acquired a special liking for human prey. The natives destroy tigers by traps, pits, poisoned arrows, and other means. Tiger-hunting is a favorite Indian sport.

Tiger-beetle (*Cincindēla campestris*), a species of cole-

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opterous insects which are swift and active in their movements, and prey upon other insects.

Tiger-cat, a name of not very definite signification, sometimes given to some of those animals of the family Felidæ which are of middling size, and resemble the tiger in their form or markings, such as the chati, the margay, the ocelot, the serval, etc., which see.

Tiger-flower (*Tigridia pavonia*), a Mexican bulbous plant of the nat. order Iridaceæ, frequently cultivated in gardens on account of the magnificence of its flowers. The stem is about 1 foot in height, with sword-shaped leaves. The flowers are large, of a singular form, and very evanescent. The petals are of a fine orange-red towards the extremity; whitish or yellowish and beautifully spotted at the base.

Tiger-lily (*Lilium tigrinum*).

Tiger-lily (*Lilium tigrinum*) a native of China, common in American gardens, having scarlet flowers turned downward, the perianth being reflexed. It is remarkable for having axillary buds on the stem. The bulbs are eaten in China and Japan.

Tiger-moth (*Arctia caja*), a genus of lepidopterous insects, the caterpillars of which are well known under the popular name of 'woolly bears.' The moth is colored red and brown. The larvæ feed on dead-nettles.

Tighe (tī), Mary Blackford, an Irish poetess, born in Dublin in 1774, and married to Henry Tighe in 1793. Her writings were published after her death in 1810. Her chief poem is *Psyche, or the Legend of Love*, written in the Spenserian stanza. Her other poems are short occasional pieces, frequently of a religious cast.

Tiglath-pile'ser. See *Assyria.*

Tigra'nes. See *Armenia.*

Tigré. See *Abyssinia.*

Tigris (tī'gris), a river in Western Asia, having its principal source in the Turkish province of Diarbekir, on the southern slope of the Anti-Taurus, a few miles to the east of the Euphrates. It flows generally southeast, passes Diarbekir, Mosul and Bagdad, and joins the Euphrates somewhat more than 100 miles from its embouchure in the Persian Gulf, after a course of 1100 miles, the united stream being known as the Shatt-el-Arab. Large rafts, supported by inflated skins, are much in use for the transport of goods. The region between the Tigris and the Euphrates is known as Mesopotamia.

Tikus. See *Bulau.*

Tilden (til'den), Samuel Jones, statesman, born in New Lebanon, New York, in 1814. He was elected to the State assembly in 1845, and in 1846 was a member of the State Constitutional Convention. From 1855 more than half the railway corporations in the North were his clients. By 1868 he had become the leader of the Democratic party in New York State. His determined opposition and practical measures broke up the Tweed ring. He was elected in 1874 Governor of New York and in 1876 was Democratic candidate for President. The election was so close that a contest arose, the dispute being finally settled by the decision of an Electoral Commission. The electoral vote, as declared finally, was 185 for Hayes; 184 for Tilden. In 1880 and in 1884 a renomination was pressed upon him, but declined. The greater portion of his fortune (which was estimated at $5,000,000) he devoted to public uses, but the will was contested and the estate went to the next of kin. He died August 4, 1886.

Tile (tīl), a term applied to a variety of articles made either for ornament, such as inlaid paving tiles (see *Encaustic Tiles* and *Mosaic*), or for use, as in tile-draining (see *Draining*) and roofing, which last are made similarly to bricks, and of similar clay.

Tiliaceæ (til-i-ā'se-ē), the lime-tree family, a nat. order of polypetalous dicotyledonous plants, consisting chiefly of trees or shrubs, with simple, toothed, alternate leaves, furnished with stipules. The species are generally diffused throughout the tropical and temperate parts of the globe. They have all a mucilaginous wholesome juice, and are remarkable for the toughness of the fibers of their inner bark, which is used for various economical purposes under the name of *bast*. Among the most important genera are *Tilia* and *Corchorus*, the former containing the common lime, the latter jute.

Till, a name given in Scotland to unstratified stony bowlder-clays, and now extended by geologists to any similar surface or drift deposit.

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Tillandsia (til-and'si-a), a genus of epiphytes, belonging to the nat. order Bromeliaceæ, natives of tropical America. *T. amœna* and *T. splendens* are cultivated in hothouses on account of the singular variety and splendor of the colors of the spathes and flower-spikes. *T. usneoides* is a native of the Southern United States, where it hangs in festoons from trees.

Tiller (til'ẽr), the lever or handle of the helm by which the rudder of a vessel is turned. See *Steering Apparatus.*

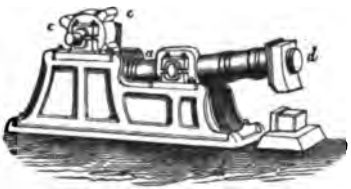
Tillman (til'man), BENJAMIN RYAN, statesman, born in South Carolina in 1847. A farmer until 1886, he began to agitate for industrial education and other reforms; was elected Governor of South Carolina in 1890 and 1892 and United States Senator in 1894. As a member of the Senate he has been radical in his views and very pronounced in his expression of them. He instituted in his state a system of selling liquor under State control and founded an industrial school for boys, the largest in the South. He died July 3, 1918.

Tillotson (til'ot-sun), JOHN, an English prelate, son of a clothier near Halifax, was born in 1630. In 1647 he became a student of Clare Hall, Cambridge, and was elected a fellow in 1651. He was a Presbyterian preacher until 1662, when he submitted to the Act of Uniformity, and was chosen preacher to the society of Lincoln's Inn, and lecturer at St. Lawrence, Jewry, in 1664. After becoming a D.D. in 1666, he was made king's chaplain, and presented to a prebend of Canterbury. He was subsequently appointed dean of Canterbury, and in 1689 he became dean of St. Paul's. During the suspension of Archbishop Sancroft, Tillotson exercised the archiepiscopal jurisdiction, and in 1691 reluctantly accepted the archbishopric. His liberal views rendered him obnoxious to the advocates of orthodoxy, and he was assailed with great animosity after his acceptance of the primacy. He died in 1694. Tillotson's sermons were at one time very popular.

Tilly (til'i, tē-yē), JOHANN TSERKLAES, COUNT OF, one of the most celebrated generals of the seventeenth century, born about 1559, in Walloon Brabant. After being educated by the Jesuits he served successively in the Spanish, Austrian, and Bavarian armies. On the outbreak of the Thirty Years' war he led the army destined to crush the Protestants in Bohemia. (See *Thirty Years' war.*) He defeated them on the White Mountains (Nov., 1620), and in 1622 conquered the Palatinate, defeating several Protestant commanders. On August 27, 1626, he defeated Christian IV of Denmark in Brunswick, and compelled him to return to his own country. In 1630 Tilly succeeded Wallenstein as generalissimo of the imperial troops. The act by which he is best known in history is the bloody sack of Magdeburg, May 10, 1631, the inhabitants being ruthlessly slaughtered. Gustavus Adolphus met him at Breitenfeld, near Leipzig, September 7, and Tilly was entirely beaten, and was himself wounded. In a subsequent engagement with the Swedes on the Lech a cannon-ball shattered his thigh, and caused his death in 1632.

Tilsit (til'sit), a town of East Prussia, on the Memel, by means of which it carries on a large trade. Manufactures include iron castings, machinery, paper, cloth, soap, oils, leather, cheese, etc. Pop. 37,148. The town is celebrated for the peace concluded here in July, 1807, between Russia and Prussia and Napoleon. See *Prussia.*

Tilt-hammer, a large and heavy hammer worked by steam or water power, and used in forgings. It has been largely superseded by the steam-hammer, but is still advantageously used with light work. Cogs (a:



Tilt-hammer.

at *c c* in cut) being brought to bear on the tail of the hammer (*a*), its depression causes the head (*d*) to be elevated, which, when the tail is liberated, falls with considerable force by its own weight.

Tilton (til'tun), THEODORE, author, was born in New York City in 1855; died in 1907. He was chief editor of the *Independent*, 1863-71, and of the *Golden Age*, 1871-74. He wrote *The Sexton's Tale* (poems, 1867); *Sanctum Sanctorum* (1869); *Tempest Tossed* (1874); *Thou and I* (poems, 1882), etc.

Timber (tim'bẽr), a general term applied to wood used for constructive purposes, as that of the different kinds of fir and pine, the oak, ash, elm, beech, sycamore, chestnut, walnut, mahogany, teak, etc. The sap in

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taken prisoner. The conquests of the Tartar now extended from the Irtish and Volga to the Persian Gulf, and from the Ganges to the Grecian Archipelago. He was making mighty preparations for an invasion of China when death arrested his progress at his camp at Otrar, beyond the Sir-Daria, in 1405, and his empire immediately fell to pieces. He was fanatical in his religion, and although no conquests were ever attended with greater cruelty, devastation, and bloodshed, he was in a measure a patron of science and art, and is also reputed author of the *Institutions of Timur* and the *Autobiography of Timur*, both translated into English.

Tin, a hard, white, ductile metal; atomic weight 118; chemical symbol Sn (from *L. stannum*). Tin appears to have been known in the time of Moses; and the Phœnicians traded largely in the tin ores of Cornwall. The mountains between Galicia and Portugal, and those separating Saxony and Bohemia, were also productive of tin centuries ago, and still continue unexhausted. Tin occurs in the Malay Peninsula, the island of Banca, India, Mexico, Bolivia, Peru, the United States, Australia, etc. In the United States there are rich deposits of both vein ore and stream-tin, but they are yet little worked, the extraction of the tin being difficult. The most important localities are the Straits Settlements, Banca, and Bolivia. In Australia tin is found in New South Wales and Victoria; also occurs in Tasmania. There are only two ores of tin; the native binoxide, called *tin-stone*, and the double sulphide of tin and copper, called *tin-pyrites*. The former is the only ore used for obtaining metallic tin. It occurs in various crystallized forms, in deep lodes blended with several other metals, as arsenic, copper, zinc, and tungsten, when it is known as *mine-tin;* or, in disseminated masses in alluvial soil, in which state it is called *stream-tin*. Mine-tin, when reduced to the metallic state, yields *block-tin*, while stream-tin yields a purer sort called *grain-tin*. The ore is first ground and washed, and then roasted in a reverberatory furnace to expel the sulphur and arsenic. Mixed with limestone and fuel, it is again fused in a furnace for about eight hours, the earthy matters flowing off with the lime, while the oxide of tin, reduced to a metallic state, falls by its own weight to the bottom, and is drawn off. The tin, still impure, is again moderately heated, when it melts and flows off into the refining basins, leaving the greater part of the foreign metals in a solid state. The molten tin is stirred in order to disperse the gases, and, when partially cool, it separates in zones, the upper consisting of nearly pure tin, while the under is so impure that it must be melted again. The upper layer is removed, cast into blocks, and sold as *block-tin*, the purest specimens being called *refined-tin*. Tin-pyrites, the other ore of tin, contains from 14 to 30 per cent. of tin, and is found in Cornwall, in Saxony, and in Bolivia. Pure tin has a fine white color like silver. It has a slightly disagreeable taste, and emits a peculiar sound when rubbed. Its hardness is between that of gold and lead, and it is very malleable. Specific gravity 7.28. Melting point about 230° C. Tin is very flexible, and when bent emits a crackling sound, sometimes called the *cry of tin*. It loses its luster when exposed to the air, but undergoes no further alteration. Oxygen combines with tin, forming protoxide of tin or *stannous oxide* (SnO); *sesquioxide* (Sn_2O_3), and dioxide or *stannic oxide* (SnO_2). The compounds of chlorine with tin are dichloride or *stannous chloride* ($SnCl_2$), *sesquichloride* (Sn_2Cl_6), and *stannic chloride* ($SnCl_4$). Stannic chloride has long been known as *the fuming liquor of Libavius*, so called from Libavius, a chemist of the sixteenth century. Tin also combines with phosphorus and with sulphur. *Stannic sulphide* (SnS_2) has long been known in chemistry as *aurum mosaicum* or *mosaic gold*. Tin will unite with arsenic and with antimony, but does not readily combine with iron. Combined with copper it forms bronze, bell-metal, and several other useful alloys. With lead it forms pewter and solder of various kinds. *Tin-plate* is formed by dipping thin plates of iron into melted tin; they are afterwards cleaned with sand and steeped for twenty-four hours in water acidulated by bran or sulphuric acid. Tin is principally employed in the formation of alloys. Its oxides are used in enameling, and for polishing the metals, and its solution in nitro-muriatic acid is an important mordant in the art of dyeing, rendering several colors, particularly scarlet, more brilliant and permanent. Tin-plate is used for roofing, the making of culinary utensils, etc.

Tinamou (tin'a-mö), the name given to a genus and family of birds occurring in South America, and allied in some respects to the ostrich and emeu. They somewhat resemble a partridge, and vary in size from that of a pheasant down to that of a quail. The

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great tinamou (*Tinămus brasiliensis*) is about 18 inches long, and inhabits the forests of Guiana.

Great Tinamou (*Tinămus brasiliensis*).

Tinavelly. See *Tinnevelli*.

Tincal (ting'kal), the commercial name of borax in its crude or unrefined state. See *Borax*.

Tincture (tingk'tūr), a spirituous solution of the active principles of some vegetable or other medicinal substance.

Tindal (tin'dal), MATTHEW, an English controversial writer, born about 1657; entered Lincoln College, Oxford, in 1672; became a fellow of All Souls', and received the degree of LL.D. After the revolution he sat as a judge in the Court of Delegates. In 1706 he published a treatise entitled the *Right of the Christian Church*, attacking hierarchical supremacy. This work excited the animosity of the high church clergy, and the House of Commons ordered it, together with two defenses of it written by Tindal, to be burned by the common hangman. In 1730 he published his most famous work, *Christianity as Old as the Creation, or the Gospel a Republication of the Religion of Nature*, in which he maintains that there has been no revelation distinct from the internal revelation of the law of nature in the hearts of mankind. He died in 1733.

Tindall, or TYNDALE, WILLIAM, a martyr to the Reformation, born about 1484 in Gloucestershire, and educated at Oxford. After taking orders he went as a tutor to Gloucestershire, where, in consequence of his opinions in favor of the reformation doctrines, he was reprimanded by the chancellor of the diocese. He then removed to London, where he probably began his English version of the New Testament, and subsequently proceeded to Germany, visiting Luther at Wittenberg. Having completed his translation he got it partly printed in quarto at Cologne; but he had to flee from this town, and the complete work was printed in octavo at Worms. The greater part was sent to England, and the prelates Warham and Tunstall collected all copies they could seize or purchase, and committed them to the flames. The only fragment of the quarto edition known to exist is preserved in the British Museum. Of the first octavo edition only two copies remain, one in the Baptist Museum at Bristol, the other (imperfect) in the library of the Chapter of St. Paul's. Revised editions were soon issued by Tindall himself. Tindall also translated the Pentateuch, and subsequently Jonah. In 1530 he took up his residence at Antwerp. In 1535 he was thrown into prison at Vilvorde near Brussels, and being found guilty of heresy he was strangled in 1536 and his body burned at the stake. Tindall's translation of the Scripture is highly esteemed for perspicuity and noble simplicity of idiom.

Tinder (tin'dėr), any substance artificially rendered readily ignitible but not inflammable. Before the invention of chemical matches it was the chief means of procuring fire. The tinder, ignited by a spark from a flint, was brought into contact with matches dipped in sulphur. Tinder may be made of half-burnt linen, and of various other substances, such as amadou, touchwood, or German tinder (which see).

Tinea. See *Ring-worm*, also *Clothes-moth*.

Tin-foil, pure tin, or an alloy of tin and lead, beaten into leaves about $\frac{1}{1000}$th part of an inch thick. When coated with mercury it forms the reflecting surface of glass mirrors.

Tinnevelli (tin-ē-vel'i), a town in the southeast of India, in the presidency of Madras, the largest town of the district of the same name, the administrative headquarters of which are at Palamkotta (which see) on the other side of the Tambraparni River. It has an interesting ancient temple and is an active Protestant missionary center. Pop. 40,469.— The district, which occupies the extreme southeastern corner of the Indian peninsula, has an area of 5381 square miles. Pop. 2,059,607.

Tinning (tin'ing), the process of covering or coating other metals with a thin coat or layer of tin, to protect them from oxidation or from corrosion by rust.

Tinos (tē'nōs), or TINO (anciently *Tenos*), an island in the Grecian

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Archipelago, one of the Cyclades, immediately southeast of Andros; area, about 85 sq. miles. It produces barley, silk, wine, figs, oranges, and honey. There is a town of the same name near the south coast. Pop. of the island 12,300; of the town, about 2000.

Tin-plate. See *Tin.*

Tintoretto (tēn-tō-ret'tō), the surname of a Venetian historical painter, GIACOMO or JACOPO ROBUSTI, born at Venice in 1518; died there in 1594. He studied for a few days under Titian, but, being dismissed without explanation by his master, he afterwards pursued his studies alone, and endeavored, according to his own motto, to unite Titian's colorings with the drawing of Michael Angelo. He painted many works for his native city, among which are a *Last Judgment*, the *Israelites Worshiping the Golden Calf*, a *Crucifixion*, the *Marriage of Cana*, the *Miracle of St. Mark* ('Miracolo dello Schiavo'), his masterpiece. His portrait, by himself, is in the Louvre; and there are many of his paintings in Germany, Spain, France, and England. Equal in several respects to Titian or Paul Veronese, he wants the dignity of the former, and the grace and richness of composition of the latter. His manner of painting was bold, with strong lights, opposed by deep shadows. His execution was very unequal.

Tinoceras (tī-nos'ēr-as), or TINOTHERIUM, a genus of mammals now extinct, found in the Eocene, and representing the order Dinocerata. The individuals were all large, some of them nearly equaling the elephants, while the brain was smaller than that of any living or fossil mammal.

Tippecanoe (tip-pe-ka-nō'), a river of Indiana, which rises in the N. part of the State, flows W. S. W. and S. 200 miles, and empties into the Wabash 10 miles above Lafayette. It is famous for the battle fought near its mouth, November 7, 1811, in which the Indians, undet Tecumseh's brother, the prophet, were defeated by General Harrison.

Tipperah (tip-pē'rā), a district of British India, in the Chittagong division of Bengal; area, 2491 square miles. Capital, Cornilla.

Tipperary (tip-pēr-ā'ri), an inland county in Ireland, in the province of Munster; area, 1659 square miles. The soil is extremely fertile; the chief crops are oats, potatoes, and wheat. The highest elevation is 3000 feet: the level country forms part of the great central plain of Ireland, and includes some branches of the Bog of Allen. It is drained mainly by the river Suir. Mineral productions comprise coal, copper, zinc and argentiferous lead; slates of good quality are extensively obtained near Killaloe. Grazing is the principal employment, and there are numerous dairies. Chief towns: Clonmel, Carrick-on-Suir, Nenagh, Thurles, Cashel, Tipperary and Roscrea. Pop. 160,232.—TIPPERARY, the county town, situated on the river Arra, 98 miles S. W. of Dublin, in a district called, from its fertility, the 'Golden Vale.' It has a large trade in butter. Pop. 6281.

Tippoo Sahib (ti-pō' sa'hib), Sultan of Mysore, son of Hyder Ali, born in 1749, succeeded his father in 1782. (See *Hyder Ali Khan.*) He continued the war in which his father was engaged with the British, and abandoned the Carnatic in order to check the British advance on the Malabar coast. In April, 1783, he forced the British commander, Matthews, to surrender at Bednore. Matthews and a part of the garrison were put to a shameful death. Mangalore also fell into his hands; but in March, 1784, being deprived of the assistance of the French by the Treaty of Versailles (Sept., 1783), he was induced to sign the Treaty of Mangolore on advantageous terms. In 1789 he attacked the Rajah of Travancore, an ally of the British. An offensive and defensive alliance was concluded (June, 1790) between the East India Company, the Peishwa of the Mahrattas, and the Nizam. In the campaign of 1790 and 1791 several places were reduced by the allies, and Tippoo was finally besieged in his capital, Seringapatam. By a peace concluded in Feb., 1792, the sultan agreed to relinquish half his territory and to pay 33,000,000 rupees. But Tippoo was unwilling to submit to this loss and entered into negotiations with the French. Suspecting that Tippoo's preparations were connected with Bonaparte's invasion of Egypt, the Company determined to anticipate hostilities, and on Feb. 22, 1799, in connection with their allies, they declared war against the sultan. Tippoo was defeated in two battles, and retreated to Seringapatam; which place was attacked by General Baird on May 4, and completely reduced, Tippoo perishing in the assault.

Tipton (tip'tun), a town in Staffordshire, England, 8 miles W. N. W. of Birmingham. It depends chiefly on its manufactures of heavy iron goods. Pop. 31,763.

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Tipula (tip'u-la), a genus of dipterous insects or flies, of which the great crane-fly (*T. gigantea*) is a typical species. See *Crane-fly*.

Tiraspol (tye-ras-pol'y'), a town of South Russia government Kherson, on the Dniester. Pop. 31,616.

Tirlemont (tirl-mŏn), a town of Belgium, in South Brabant. It has a church dating from the ninth century, and manufactures of woolens, breweries, and a large trade. Pop. 18,544.

Tirnau (tir'nou), TYRNAU, a royal free town of Hungary, county of Pressburg. Pop. 13,181.

Tirnova (tir'nŏ-vâ), or TER'NOVA, a town of Bulgaria, capital of province of same name. Pop. 12,185.

Tirol. See *Tyrol*.

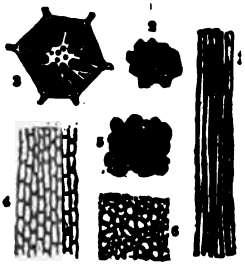
Tirpitz (teer'pitz), ALFRED, GRAND ADMIRAL VON, a German commander, born in 1849. He entered the navy at sixteen; saw service in South America and the West Indies and in the Franco-German war. He was made a rear-admiral in 1895, and in 1898 became secretary of state for the Admiralty, the head of the German navy. He is a man of great personal force and has done much to build up the German navy.

Tiryns (tī'rins), a very ancient ruined city of Greece, in the Peloponnesus, in the plain of Argolis, about 3 miles from the sea, with remains of Cyclopean walls, and of a palace of the eleventh or tenth century B.C., excavated by Schliemann.

Tischendorf (tish'en-dorf), LOBEGOTT FRIEDRICH KONSTANTIN, a German biblical critic, born in 1815, studied at Leipsic, and in 1845 became professor extraordinary there, becoming professor ordinary of theology in 1850. He made several visits to the East, and brought back valuable MSS., the most remarkable being (in 1859) the famous Sinaitic Codex (which see). Tischendorf was continually engaged in editorial labors, and was broken down by overwork in 1873. He died at Leipsic in 1874.

Tisio. See *Garofalo, Benvenuto*.

Tissue (tish'ū), (1) in animal anatomy, the texture or grouping of anatomical elements of which the systems of organs are composed. Thus in special histology we speak of *muscular tissue*, or flesh; *osseous tissue*, or bone; *adipose tissue*, or fat; *cartilaginous tissue*, or gristle; *pigmentary tissue*, or coloring matter seen in the skin, etc.; *areolar, cellular*, or *connective tissue*, widely distributed in every part of the body, and serving to bind together and consolidate other parts and tissues. (2) In vegetable anatomy, the minute elementary structures of which the organs of plants are composed. Plant tissues



VEGETABLE TISSUE.

1, Prosenchyma or Woody Tissue. 2, Horizontal section of Prosenchymatous Tissue. 3, Do. do. of a Single Cell, showing the successive layers of deposit in the interior which give hardness and firmness to the wood of plants. 4, Cylindrical Parenchyma. 5, Round or Elliptical Parenchymatous Tissue. 6, Spongiform or Stellate Tissue.

are composed of elementary membrane and elementary fiber, and the principal forms under which they exhibit themselves constitute *cellular tissue*, *fibrous tissue*, and *vascular tissue*.

Experiments have been made in keeping pieces of animal tissue alive in proper media outside of the body. So far they can be kept alive only for a certain length of time—from three to fifteen days—but it is believed that death may be rather contingent than necessary, due to the accumulation of waste products. Alexis Carrel has devised a system of artificial rejuvenescence, by washing the tissue from time to time in Ringer's solution and by placing it in a medium of plasma and distilled water. The excised heart of a turtle will, under appropriate conditions, continue beating for several days.

Tit. See *Titmouse*.

Titania. See *Mab*.

Titanic, WRECK OF THE. On the night of April 14-15, 1912, took place the greatest disaster recorded in the history of ocean travel, the total wreck on her maiden trip, of one of the two largest ships that had ever been built, with the loss of 1635 of her passengers and crew. The Olympic and Titanic, of 66,000 tons each, were launched by the White Star Line—the Olympic in 1910, the Titanic in 1911. These floating palaces were of equal dimensions, having a total

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length of 882½ feet, breadth 92½ feet, and height from bottom of keel to top of the captain's house 105½ feet. Their decks numbered 11, and they were equipped with 15 watertight bulkheads, the claim being made that they were unsinkable. While of 66,000 tons displacement, their registered tonnage was 45,000 tons. The Titanic, the one of these twin steamers with which we are specially concerned, was capable of carrying 5000 passengers, and had an average speed of 21 knots. She was prepared in almost every particular for the comfort, enjoyment and safety of her passengers, being equipped with such unusual appliances as salt-water swimming pools, squash racquet courts, sun parlors and other pleasure devices. The one contingency unprovided for was that of sufficient lifeboats to carry those on board in the improbable event of an accident. Her watertight compartments were deemed sufficient.

The Titanic left Southampton, England, on April 10, 1912, in charge of Captain E. J. Smith, a navigator of long experience, her crew and passengers numbering 2340. A disaster was threatened at the outset, the suction made by her great bulk as she began her course being so great as to drag the American liner New York from her quay, a perilous collision being imminent. Proceeding on her eventful voyage, Sunday, April 14, found her in the seas southeast of Newfoundland, then infested with icebergs to an unusual extent. News of the presence of these bergs was received by wireless messages from other vessels, but there was no abatement in the speed of the Titanic, her record rate of 21 knots an hour being maintained. At 10.25 at night her wireless operators sent news of disaster far over the seas, their message being picked up by a number of ships within range. It stated that the Titanic had struck an iceberg and needed immediate assistance, her position being given as latitude 41° 46′ north, longitude 50° 14′ west. The shock of the collision with the berg had been so slight that few of those on board apprehended danger until an hour or more had passed. Then it grew apparent that the ship was fatally wounded and was slowly filling and the lifeboats were hastily lowered and set afloat, the men on board holding heroically back and putting the women and children on board. Unfortunately the boats were not capable of holding one third of the passengers and crew, yet no panic took place, the greatest heroism was shown, and when the great ship finally plunged beneath the waters, at 2.20 A. M., carrying more than 1600 to inevitable death, she did so with the band playing, and without a cry of despair from the doomed multitude.

It was at break of day that the Carpathia, reached by the call for aid, came within sight of the lifeboats. Those who had not perished from exposure were taken on board and the ship's head was turned backward for New York, whence she had sailed. She arrived with the rescued on the evening of Thursday, April 18. Those alive numbered 705. Several died on the voyage homeward. The story told indicated that the berg had rent the side of the Titanic through a great part of her length, rendering many of her waterproof compartments useless. The disaster would probably not have occurred in a head-on collision. The loss was great, not only in life, but in value of the ship and cargo, estimated at $12,500,000. A number of multi-millionaires and prominent persons were aboard. Investigation into the causes of the disaster led to more adequate safety regulations.

Titanium (ti-tā'ni-um), a metal discovered in 1791. It is found combined with oxygen in several minerals, and occurs especially in iron ores, which hence receive the name of titaniferous iron ores. Titanium is a dark green, heavy, amorphous powder, and some authorities doubt its metallic character. The ores of this metal include menachanite, from Menachan in Cornwall, where it was originally found; iserine, from the river Iser in Silesia; sphene, rutile, brookite, etc.

Titans (tī'tans), in Greek mythology, the sons and daughters of Urānus (Heaven), and Gē (Earth). They were twelve in number, six sons and six daughters. They rose against Urānus, and deposed him, raising Cronus, one of their number, to the throne. They were afterwards overcome by Zeus, and thrown into Tartarus.

Titchener, EDWARD BRADFORD, an Anglo-American psychologist, born at Chichester, England, in 1867. He studied at Brasenose College, Oxford, and at the University of Leipzig, and was extension lecturer at Oxford until 1892. He has been Sage professor of psychology there since 1895, and has gained international fame. His best-known works include *Experimental Psychology* (1901-05); *Lectures on the Experimental Psychology of Thought Processes* (1909); and *Textbook of Psychology* (1909-10).

Tithe (*tīth;* Anglo-Saxon, *teōtha,* 'a tenth part'), the tenth part of the increase yearly arising from the profits of lands, the stock upon lands, and the industry of the occupants, al-

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lotted to the clergy for their maintenance. The custom of giving and paying tithes is very ancient, and was legally enjoined by Moses (Lev. xxvii, Deut. xiv, and elsewhere). In 778 Charlemagne established the payment of tithes in those parts of the Roman Empire under his sway, dividing them into four parts: one to maintain the edifice of the church, the second to support the poor, the third the bishop, and the fourth the parochial clergy. Similar laws were afterwards enacted in various countries of Western Europe. Their payment was first enjoined in England by a constitutional decree of a synod held in 786. Offa, king of Mercia, in 794 made a law giving the tithes of all his kingdom to the church, and similar laws were enacted by Athelstan and Canute. The first mention of tithes in statute law is in 1285. In the earliest arrangement a man might give the tithes to what priests he pleased, which were called *arbitrary consecrations of tithes;* but when dioceses were divided into parishes, the tithes of each parish were allotted to its own particular minister. It is now generally held that tithes are due of common right to the parson of the parish, unless there be a special exemption. The parson of the parish may be either the actual incumbent or else the appropriator of the benefice. (See *Impropriations.*) Tithes in English law are of three kinds: 1. *prædial*, arising immediately from the soil, as corn, hay, fruit, etc.; 2, *mixed*, such as calves, lambs, pigs, fowls, wool, etc.; 3, *personal*, arising from the profits of personal industry in a trade, profession, or occupation. They are divided into *great* and *small*. Great tithes are chiefly corn, hay, and wool, and belong to the rector; small tithes are chiefly mixed and personal tithes, and belong to the vicar. Originally all the land in the kingdom, except crown and church lands, was tithable. By acts passed in the reign of Henry VIII, however, tithes could be temporarily redeemed by the payment of a lump sum. The circumstance that tithes were enacted from dissenters and the difficulties of collecting them, long led to constant bickerings between the clergy and the people. The popular demand for a measure of commutation was at last met by the Tithe Commutation Act (1836). This act. amended by subsequent statutes, provides for the conversion of all the uncommuted tithes in England and Wales into a corn and rent charge, payable in money, and estimated on the average price of a bushel of corn for the seven years ending at the preceding Christmas. In Ireland the tithes were commuted into a money rent charge in 1838, which by the Irish Church Act of 1869 was vested in the commissioners of church temporalities, with power to sell such rent charge at 22½ years purchase to the landowner. The tithes in Scotland are called *teinds* (which see). Tithes were collected in Virginia in colonial times, and Patrick Henry first won fame as an orator by his vigorous defense of those who refused to pay them. The lack of an established church has kept this form of taxation out of the United States, all church support being voluntary.

Tithing (tĭth'ĭng), an ancient subdivision of England, forming part of the hundred, and consisting of ten householders and their families held together in a society, all being bound for the peaceable behavior of each other, the chief of whom was the *tithing-man*.

Tithonus (ti-thō'nus), in Greek mythology, a son, or brother, of Laomedon, king of Troy. He was beloved by Eos (Aurora, Morning), who importuned Zeus to make him immortal. Her prayer was granted, but she had neglected to ask for continual youth, and in time her lover took on all the signs of extreme age. Tithonus' prayer to the gods to be relieved of the burden of old age was answered by his being metamorphosed into a grasshopper.

Titian (tish'i-an), or TIZIANO VECELLIO (tit-si-ä'no ve-chel'li-ō), one of the most distinguished of the great Italian painters, and head of the Venetian school, was born at Pieve de Ca-

Titian.

dore, in the Carnic Alps, in 1477. He studied under Giovanni Bellini of Venice, and in 1507 was associated with the painter Giorgione in executing certain frescoes. In 1511 he was invited to

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Padua, where he executed three remarkable frescoes which are still to be seen there. In 1512 he completed the unfinished pictures of Giovanni Bellini, his former master, in the Sala del Gran Consiglio at Venice, and the senate were so pleased that they gave him an important office. To this period are attributed his pictures of the *Tribute Money* and *Sacred and Profane Love*. In 1514 he painted a portrait of Ariosto at Ferrara, and after his return to Venice he painted an *Assumption of the Virgin* (1516), considered one of the finest pictures in the world; it is now in the Academy of the Fine Arts in Venice. About 1528 he produced his magnificent picture, *The Death of St. Peter the Martyr*—'a picture,' says Algarotti, 'in which the great masters admitted they could not find a fault,' unfortunately destroyed by fire in 1867. In 1530 the Emperor Charles V invited him to Bologna to paint his portrait and execute various other commissions. In 1532 he again painted the emperor's portrait, and he is said to have accompanied Charles to Madrid, where he received several honors. He remained, it is said, three years in Spain, in which country many of his masterpieces, such as *The Sleeping Venus, Christ in the Garden, St. Margaret and the Dragon*, are still to be found. In 1537 he painted an *Annunciation*, and in 1541 he produced *The Descent of the Holy Ghost on the Apostles, The Sacrifice of Abraham*, and *David and Goliath*. In 1543 he painted his picture of *The Virgin and San Tiziano;* and in 1545 he visited Rome, where he painted the famous group of *Pope Paul III, the Cardinal Farnese, and Duke Ottavio Farnese*. He was patronized as warmly by Philip II as by his father, Charles V. Of Titian's private life but little is known. He died of the plague in 1576, aged ninety-nine, having painted to the last with almost undiminished powers. Titian excelled as much in landscape as in figure-painting, was equally great in sacred and profane subjects, in ideal heads and in portraits, in frescoes and in oils; and though others may have surpassed him in single points, none equaled him in general mastery. As a colorist he is almost unrivaled, and his pictures often reach the perfection of sensuous beauty.

Titicaca (tit-ē-kä'kȧ), a lake on the northwestern frontiers of Bolivia, situated in a valley of the Andes, 12,600 feet above sea-level; estimated area, 5300 square miles. It contains several islands, and abounds with fish.

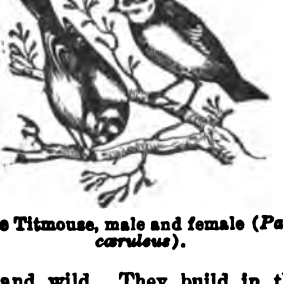
Titlark. See *Pipit.*

Title-deeds, in law, are the documents, such as mortgages, conveyances, etc., which afford evidence of the ownership of real property.

Titles of Honor, appellations given to certain persons in virtue of particular offices or dignities possessed by them, or as marks of distinction and special rank. They have existed probably among all peoples. Such were in Rome the titles of Magnus (Great) and Africandus (African); and the epithets Cæsar, the name of a family, and Augustus, which were gradually applied to all who filled the imperial throne. See *Nobility, Peer,* and *Address (Forms of)*.

Titling. See *Pipit.*

Titmouse (tit'mous), TIT, or TOMTIT, the name given to a number of dentirostral insessorial birds inhabiting most parts of the world. They are very active little birds, continually flitting from branch to branch, devouring seeds and insects and not sparing even small birds when they happen to find them sick and are able to put an end to them. Their notes are



Blue Titmouse, male and female (*Parus cæruleus*).

shrill and wild. They build in the hollows of trees, in walls, etc. The great titmouse (*Parus major*) is between five and six inches long, and inhabits Europe generally. There are various other European species, and several occur in the United States, some of them known as *chickadee* (which see).

Titration (tī-trā'shun), in chemical analysis, a process for ascertaining the quantity of any given constituent present in a compound, by observing the quantity of a liquid of known strength (called a *standard solution*) necessary to convert the constituent into another form. The reaction is

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usually marked by a change of color or by the formation of a precipitate.

Titus (tī'tus), or in full, TITUS FLAVIUS SABINUS VESPASIANUS, a Roman emperor, born A.D. 40, was the eldest son of the Emperor Vespasian. He served with credit as a military tribune in Germany and Britain, and accompanied his father in the war against the Jews as commander of a legion. When Vespasian became emperor (69) Titus was left to conduct the war in Judea. He took Jerusalem (A.D. 70), and after visiting Egypt returned to Rome in triumph, and was associated with his father in the government of the empire. He became sole emperor in 79, and showed himself an enlightened and munificent ruler, distinguished by benevolence and philanthropy. He died Sept. 13, 81, after a reign of a little over two years and two months. His brother Domitian was strongly suspected of having poisoned him.

Titus, a disciple and assistant of the apostle Paul, and the person to whom one of the canonical epistles of the New Testament is addressed. He was a gentile by origin, and probably a native of Antioch. He labored with Paul in Asia Minor, Macedonia and Crete, and is said to have been the first Christian bishop of Crete.

Titus, EPISTLE TO, one of the three pastoral epistles of the New Testament (the remaining two being those addressed to Timothy), believed to have been written by St. Paul after his first imprisonment at Rome. The topics handled are the same which we find in the other two kindred epistles. See *Timothy, Epistles to.*

Titus Livius. See *Livius.*

Titusville (tī'tus-vil), a city of Crawford Co., Pennsylvania on the Pennsylvania and New York Central railroads. It has steel and forge works, oil refineries and manufactures of iron, radiators, saddlery, etc. Pop. 9000.

Tiumen (tyŏ-mān'), a town in the government of Tobolsk, Western Siberia, on the Tura, an affluent of the Tobol. It is the center of the Western Siberian trade, and has various manufactures. Pop. 29,588.

Tiverton (tiv'er-tun), a municipal borough of England, in the county of Devon, pleasantly situated 12 miles north by east of Exeter. It consists of several well-formed streets, and has a spacious market place, guildhall, assembly rooms, public baths, etc.; and important manufactures of lace. Pop. (1911) 50,705.

Tivoli (tiv'ō-lē; the ancient *Tibur*), a town of Central Italy, 17 miles E. N. E. of Rome (connected by tramway), on the left bank of the Teverone (or Anio), which here forms fine falls. It has steep, narrow, and ill-paved streets, and houses in general poorly built; with a modern handsome cathedral, and some other churches. It was a favorite resort of the ancient Romans, and among the remains in the town and neighborhood are the circular temple of the Sibyl, the ruins of Hadrian's villa, the villa of Mæcenas, etc. The wine of Tivola was famous in ancient times. Pop. 12,881.

Tiziano. See *Titian.*

Tlaxcala (tlas'kä-lä), a state of Mexico, surrounded nearly on all sides by the state of Puebla; area, 15,957 square miles. Pop. 172,315. The capital, which bears the same name, was once an important city. Pop. 2715.

Tlemçen (tlem-sen'), a town of Algeria, in the province of Oran, 70 miles S. S. W. of the city of that name, finely situated 2500 feet above the sea, in the midst of olive groves, vineyards, and orchards. Its chief buildings are some fine mosques. Pop. 24,060.

Toad (tōd), the name applied to various genera of tailless amphibians. Toads have a thick, bulky body, covered with warts or papillæ. They have no teeth, and the tongue is fixed to the front of the mouth, but the posterior extremity is free and protrusible. The hind feet are but slightly webbed. They leap badly, and generally avoid the water, except in the breeding season. Their food consists of insects and worms. Toads have a most unprepossessing aspect and outward appearance. The bite, saliva, etc., of the common toad of Europe (*Bufo vulgāris*) were formerly considered poisonous, but no venom or poison apparatus of any kind exists in these creatures. The toad is easily tamed, and exhibits a considerable amount of intelligence as a pet. It lies torpid in some hole during winter. Insects are caught by a sudden protrusion of the tongue, which is provided with a viscous secretion. There are several species of toads in the United States. The Surinam toad is described in the article *Pipa.* The toad is extremely tenacious of life, but experiments have conclusively shown that there is no truth in the oft-repeated stories of the creature being able to support life when inclosed in solid rock for immense periods of time. Dr. Buckland has shown that when excluded from air and food, frogs and toads, in virtue of

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their slow circulation and cold-blooded habits, might survive about a year or eighteen months at most.

Toad-fish, a name sometimes given to the *Lophius piscatorius*. See *Angler*.

Toad-flax, the English name of various plants of the genus *Linaria*, order Scrophulariaceæ. The common toad-flax is *L. vulgāris*, which in its general habits is not unlike flax. The flowers are of a bright yellow; the corolla labiate, resembling that of snapdragon in shape, but provided with a long spur. It grows in hedges and fields, and is a reputed purgative and diuretic. The ivy-leaved toad-flax (*L. Cymbalaria*) is often found trailing over old walls. Allied to this genus is the *Antirrhinum* (which see).

Tobacco (to-bak'ō), a very important plant, belonging to the nat. order Atropaceæ, or night-shade order. The introduction of the use of tobacco forms a singular chapter in the history of mankind. According to some authorities smoking was practiced by the Chinese at a very early date. At the time of the discovery of America tobacco was in frequent use among the Indians, and the practice of smoking, which had with them a religious character, was common to almost all the tribes. (See *Calumet*.) The name *tobacco* was either derived from the term used in Hayti to designate the pipe, or from Tabaca in St. Domingo, whence it was introduced into Spain and Portugal in 1559 by a Spaniard. It soon found its way to Paris and Rome, and was first used in the shape of snuff. Smoking is generally supposed to have been introduced into England by Sir Walter Raleigh, but Camden says the practice was introduced by Drake and his companions on their return from Virginia in 1585. It was strongly opposed by both priests and rulers. Pope Urban VII and Innocent IX issued bulls excommunicating such as used snuff in church, and in Turkey smoking was made a capital offense. In the canton of Bern the prohibition of the use of tobacco was put among the ten commandments, immediately after that forbidding adultery. The *Counterblast* or denunciation written by James I of England is a matter of history. All prohibitions, however, regal or priestly, were of no avail, and tobacco is now the most extensively used luxury on the face of the earth. The most commonly cultivated tobacco plant (*Nicotiāna tabācum*) is glutinous, and covered with a very short down; the stem upright, 4 or 5 feet high, and branching; the leaves are lanceolate, sometimes two feet long; the flowers are terminal and rose-colored. A less esteemed species is *N. rustica*, distinguished by a short yellowish-green corolla. All the tobacco plants are natives of America, and that continent has continued the principal producer, the chief tobacco-growing country being the United States, and the chief localities being Kentucky, North Carolina, and Virginia. The *N. quadrivalis* and *N. repanda* have white or yellow corollas. The latter is cultivated to some extent in Cuba and is known as Yara tobacco. There are five leading types of tobacco grown in the United States — the Seed Leaf, White Burley, Heavy Shipping or Dark, Yellow, and Perique. Tobacco owes its principal properties to the presence of a poisonous alkaloid named nicotine (see *Nicotine*). The cultivated forms of the present day are highly developed and very sensitive. In some localities the plants are shielded with slats or cheese-cloth. Clayey soils yield heavy leaves; sandy soils, light. All plants except those which are to be kept for seed are topped. When the leaves begin to turn yellow the plants are cut close to the ground, and afterwards carried to the dry-shed, where they are hung up in lines to dry. Artificial heat is sometimes used. Priming, which is also largely practiced, consists in removing the leaves in the order in which they mature. When perfectly dry the leaves are stripped from the stalks and packed in boxes, in which they are allowed to heat and sweat or ferment. Cigarette tobacco is cured in large drying ovens and is consequently light in color and without the agreeable cigar-leaf aroma. Snuff is tobacco ground to a powder and perfumed. Chewing tobacco consists of pressed cakes or plugs, or of a spongy mass of fine threads called 'fine cut,' and is flavored with vanilla, sugar, licorice, etc. Pipe tobacco is sold in rolls of the natural leaf, or it may be cut fine. In the manufacture of cigars the leaves are saved for 'wrappers,' while smaller pieces, sometimes of inferior grade, are used as 'fillers.'

Virginia Tobacco (*Nicotiāna tabācum*).

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As the best leaf is grown in Cuba, so also are the best cigars made there. The leaf used for the manufacture of Manila cheroots is grown chiefly on the island of Luzon. Tobacco is one of the most profitable crops in the United States; about one-half of the production is absorbed for home use, the other being exported, the far largest customer being Britain. The plant has numerous insect enemies, among them being the Northern tobacco-worm (*Protoparce celeus*), and *P. carolina*, the tobacco-worm of the Southern States. These are called, when adult, sphinx-moths; they are strong, rapid flyers, and at twilight are often mistaken for humming-birds. The eggs are laid singly on the tobacco leaves, and quickly hatch; the larva — hornworm — is a voracious feeder and inflicts much damage, particularly in the large, 'wrapper' leaves. The greasy cutworm (*Agrostis ypsilon*) is another pest. The tobacco-fly or flea-beetle (*Crepidodera cucumeris*) lives through the winter in a winged state. The annual tobacco crop of the United States ranges from 700,000,000 to 1,000,000,000 pounds, much surpassing that of other countries, and its consumption there also much exceeds that of any other country.

Tobago (tō-bā'gō), an island of the British West Indies, belonging to the Windward group, was annexed in 1889 to Trinidad; area, 114 square miles. Two-thirds of the island are covered with primeval forests, and out of a total area of 73,313 acres, only about 10,000 acres are cultivated. Sugar, rum, molasses, and cocoanuts are the chief productions; but attention is now being turned to the cultivation of cocoa and coffee, for which the soil and climate are admirably adapted. This island is one of the most healthy of the West Indies. Tobago was discovered by Columbus in 1498, and was ceded to Great Britain by France in 1763. Principal town, Scarborough. Pop. 18,751.

Tobit (tō'bit), Book of, one of the Old Testament apocryphal books, rejected by the Jews and Protestants, but included in the Roman Catholic canon. It contains an account of some remarkable events in the life of Tobit, a Jew of the tribe of Naphtali, carried captive to Nineveh, and his son of the same name.

Toboggan (tō-bog'an), a kind of sledge, of Indian invention, made of a piece of birch bark or similar material, with the front end turned up and a rope attached by which it was drawn over the snow. This was in use in Canada and was adopted and improved by the fur-traders and explorers of that country. Lately it has become used for sport in cities of cold climates. As such it is made of carefully prepared hickory splints, from 5 to 15 feet long, the sides strongly braced, and is used to slide down a snow-covered hillside or an artificial slope covered with frozen snow, called a toboggan slide.

Tobol (to-bol'), a river of Siberia, which rises in the west slope of the Ural Mountains, in the government of Orenburg, and joins the Irtish at the town of Tobolsk, after a course of about 550 miles.

Tobolsk (tō-bolsk'), capital of the government of Tobolsk, Western Siberia, on the left bank of the Irtish. It has a cathedral, arsenal, barracks, a large prison for Siberian exiles, a theater, etc. The climate is exceedingly severe in winter. Pop. 21,401.— The government comprises the northwestern part of Siberia, and has an area of 539,659 square miles, and a population of 1,656,700. Its mineral products, of the Ural region, include iron, copper, gold, silver, and platinum. The north is widely forested; the south fertile, yielding wheat, oats, and other grains.

Tocantins (tō-kăn-tēns'), a river of Brazil, which rises in lat. 14° S., flows northward, receives the Araguay, and enters the Atlantic by the Pará estuary, forming one mouth of the Amazon. The entire course is 1590 miles, and is navigable for 1080; but navigation is much impeded by sandbanks and rapids.

Tocqueville (tok-vēl), Alexis Charles Henri Clerel de, a French writer, born in 1805; died in 1859. Being commissioned by the government to proceed to the United States to report upon the penitentiary system, the results of his inquiry were published in 1833 under the title *Du Système Pénitentiaire aux Etats-Unis et de son Application en France*. His most celebrated work, however, was *La Démocratie en Amérique* ('Democracy in America,' two vols. Paris, 1834), which was translated into the principal European languages. In 1849 he accepted the portfolio of foreign affairs, but soon resigned it. After the *coup d'état* of 1851 he lived retired from public affairs. He wrote also *L'Ancien Régime et la Révolution; Histoire Philosophique du Régne de Louis XV*, etc.

Todas (tō'das), a race inhabiting the upper part of the Neilgherry Mountains, in Southern India. They are few in number, and under the influence

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of polyandry and intemperance they are rapidly disappearing. Their language is Dravidian.

Toddy (tod'i), the name given by the English to the sweet juices which are extracted from the different species of the palm tribe, including the cocoanut tree. When newly drawn from the tree it is a sweet, cool, refreshing beverage, but when it has been allowed about ten or twelve hours to ferment it becomes highly intoxicating. The name toddy is also given to a mixture of spirits, hot water, and sugar.

Todhunter (tod'hun-ter), ISAAC, mathematician, was born at Rye, England, in 1820; studied at University College, London, and afterwards graduated as senior wrangler at St. John's College, Cambridge, where he resided as fellow, tutor, and principal mathematical lecturer until his death in 1884. He wrote a series of popular textbooks on mathematics, a *History of the Mathematical Theories of Attraction and the Figure of the Earth* (two vols., 1873), etc.

Todleben (tōt'lā-bĕn), FRANCIS EDWARD, COUNT, a Russian general and military engineer, born in 1818; died in 1884. After leaving the schools of Riga he entered the College of Engineers at St. Petersburg, and served against the Circassians in 1848. In 1854 he took the chief part in the defense of Sebastopol, and after the peace of 1856 wrote a *Narrative of the War in the Crimea*. During the Russo-Turkish war Todleben was sent (in 1887) to reduce Plevna. The place was soon invested, and Osman Pasha, the Turkish commander, was compelled to surrender at discretion. For his services Todleben was created a count, and he subsequently became commander-in-chief of the Russian army in Turkey. He was afterwards appointed governor of Odessa, and later, of Wilna.

Todmorden (tod'mor-den), a town of England, partly in Lancashire, partly in Yorkshire (West Riding), on the Calder, in a beautiful and romantic valley, 21 miles N. N. E. of Manchester. It has extensive manufactures of cotton goods. Pop. 25,455.

Tody (tō'di), the name of certain tropical birds, genus *Todus*, family Todidæ. They are birds of gaudy plumage, and feed on insects, worms, etc. The most elegant species is the *T. regius* (royal or king tody), a native of Cayenne and Brazil. The green tody (*T. viridis*) is also a pretty bird, about the size of a wren. It is very common in Jamaica.

Tofana. See *Aqua Tofana*, under *Aqua*.

Toga (tō'ga), the principal outer garment of wool worn by Roman citizens. It covered the whole of the body except the right arm, and was originally worn by both sexes until the matrons adopted the *stola*. The *toga virilis*, or manly gown, was assumed by Roman youths when they attained the age of fourteen. The variety in the color, the fineness of the wool, and the ornaments attached to it indicated the rank of the citizen; generally it was white.

Roman Senator wearing the Toga.

Togo (tō'gō), HEIHACHIRO, a Japanese admiral, who took an active part in the war with China in 1894, and opened the war with Russia in 1904 by an attack on the Russian fleet at Port Arthur. On May 27-28, 1905, he annihilated a powerful Russian fleet in the Korean Straits, winning one of the most notable of naval victories.

Togoland (tō'gō-land), a German protectorate on the Slave Coast, Guinea, acquired in 1885. It lies between the British Gold Coast Colony and Dahomey, with a coast line of 12 miles, but a wide expansion inland, the total area being estimated at 33,000 sq. miles. Various tropical plants are grown, and palm oil, gum and palm kernels are exported. Pop. estimated at 900,000, with less than 200 whites.

Tokar (tō'kar), a town of the Eastern Soudan, south of Suakin, the scene of two battles between English and Arabs in February, 1884. Pop. 20,000.

Tokat (tō-kät'), a town of Northeastern Asia Minor, 75 miles south of the Black Sea, near the Yeshil Irmak. Pop. about 30,000.

Tokay (tō-kā'), a town of Hungary, at the conflux of the rivers Theiss and Bodrog; pop. 5110. This town is celebrated for the wine grown in its vicinity, especially for a fine, rich, sweet variety. Inferior and imitation wines are often sold under this name.

Tokens (tō'kens), pieces of money current by sufferance, and not coined by authority; or coins only nomi-

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nally of their professed value. In England tokens first came into use in the reign of Henry VIII, owing to the want of authorized coins of lower value than a penny. Stamped tokens of lead, tin, and even leather were issued by vintners, grocers, and other tradesmen during the time of Elizabeth, and were extensively circulated, being readily exchanged for authorized money at the shops where they were issued. Token money has been frequently issued in other countries.

Tokio (tō'kē-ō), or TOKYO, formerly called Yeddo, the capital of Japan, and chief residence of the mikado, is situated on a bay of the same name, on the S. E. coast of Hondo, the largest of the Japanese islands, and is connected by rail with Yokohama and Kanagawa. The bulk of the houses are of wood, but there are many new buildings of brick and stone, and an imperial palace has been erected near the center, as also

public offices, etc. The greater part of the town is flat, and intersected by numerous canals crossed by bridges. The streets of the modern city have been made fairly wide and regular; they are kept clean and some of them are traversed by railways. Gas has been introduced, and the sanitary arrangements have been improved. Education is well organized, and there are numerous private and elementary schools. Tokio contains the imperial university, the most important educational institution of the empire, with full faculties and an attendance of about 4000 students. This city may be considered the center of the political, commercial, and literary activity of Japan. Its foreign trade is limited, on account of the shallowness of the bay and rivers, but manufactures are active and developing. Its population, once estimated at 1,500,000, fell off till in 1872 it was about 780,000. It has since rapidly increased and in 1909 was 2,168,151, ranking as the fifth city in the world.

Toland (tō'land), JOHN, an English deist, born in 1669; died in 1722. He entered Glasgow University in 1687; was graduated M.A. from Edinburgh in 1690, and afterwards studied theology at Leyden. In 1696 he published his *Christianity not Mysterious*, which created a great sensation, and was burnt by the hangman at Dublin, by order of the Irish parliament, in 1697. He subsequently settled down as a voluminous pamphleteer in London. Of his other works the chief were: *Life of Milton* (1698), accompanying an edition of his writings, *Anglia Libera* (1701), *Socinianism Truly Stated* (1705), and *Pantheisticon* (1750). In the last of these works Toland distinctly avowed himself a pantheist.

Toledo (tō-lē'dō; anciently *Tolētum*), a city of Spain, in New Castile, capital of a province of the same name, on a rocky eminence washed by the Tagus, and 1820 feet above the sea, 55 miles southwest of Madrid. It is the see of an archbishop, who is primate of Spain. The streets are narrow and steep, and the houses crowded together. Toledo contains a ruined alcazar, or palace and fortress, dating from 1551, and a Gothic cathedral, one of the grandest in the world, completed in 1492, in the style of the thirteenth century; also other interesting buildings. The Toledo sword-blades, renowned for many centuries, are manufactured in a large building (a government establishment) on the Tagus, about a mile from the town. Toledo was taken by the Romans in 193 B. C., and is celebrated in the history of Spain. It was successively the seat of government under the Goths, Moors, and kings of Castile. Pop. 23,317. Province: area 5919 sq. miles. Pop. 376,814.

Toledo, a city, capital of Lucas Co., Ohio, on the Maumee River, about six miles from Lake Erie, and 65 miles S. S. W. of Detroit. Toledo is the northern terminus of the Miami and Erie Canal, and the center of several extensive railway lines. It has an excellent harbor and is one of the largest

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grain-shipping points of the country; also ships large quantities of iron-ore, coal, lumber, provisions, live stock, etc. Manufactures are important, beer and wine being largely produced and many other articles made. Boat- and ship-building are large industries. The city has some notable public buildings, and possesses a zoölogical garden. Pop. 168,497.

Tolentino (tō-lān-tē'nō), a town of Central Italy, in the province of Macerata, with a fine cathedral. Here Pope Pius VI, in 1797, concluded a humiliating peace with Bonaparte, and in the neighborhood, in 1815, Murat, at the head of the Neapolitans, was defeated by the Austrians under Bianchi. Pop. (commune) 13,197.

Toleration. See *Religious Liberty.*

Toleration, Act of. See *Act of Toleration.*

Tolima (tō'lē-mȧ), a state of the Republic of Colombia, intersected by the upper course of the Magdalena, and embraced between the two chief chains of the Cordillera; area, 18,400 sq. miles. It produces cacao, sugar, maize, and tobacco, and is rich in gold and silver. The volcano of Tolima has a height of 17,660 feet. Pop. 305,185. Capital, Neiva.

Toll (tōl), a tax paid, or duty imposed, for some liberty or privilege or other reasonable consideration; such as (*a*) the payment claimed by the owners of a port for goods landed or shipped there; (*b*) the sum charged by the owners of a market or fair for goods brought to be sold there; (*c*) a fixed charge made by those intrusted with the maintenance of roads, streets, bridges, etc., for the passage of persons, goods, and cattle. See *Roads.*

Tolstoï (tol'stoi), Count Leo Nikolaievitch, a celebrated Russian novelist, born Aug. 28, 1828. In 1851 he accompanied his brother to the Caucasus and entered the army, and during the Crimean war took part in the defense of Sebastopol. At the close of the war he retired to his estates and devoted himself to literary composition and schemes for the education and social improvement of the peasantry. Eventually he gave himself up to working out the higher problems of life experimentally — working along with the peasantry in a sort of communistic life. Among his earliest writings of moment are his vivid sketches from Sebastopol. His three great novels are the *Cossacks, War and Peace,* and *Anna Karenina.* His later writings are all mostly directed towards an explanation of his peculiar social and mystic religious ideas. Among them are *Confessions, My Religion, The Search for Happiness, Two Generations, Infancy and Youth, Death, Great Problems of History, What is My Life? The Kreutzer Sonata,* etc. Regarded as one of the leading writers and reformers of the world, he was annoyed in his old age by visitors and the social duties which interfered with his life pursuits, and left home secretly with an idea of escaping these distractions. The severe weather to which he was thus exposed brought on inflammation of the lungs, and he died November 19, 1910.

Toltecs (tol'teks), a prehistoric people of Mexico and Central America, to whom the Aztecs and the Mayas ascribed their arts and ancient monuments. See *Mexico.*

Tolu-balsam (tō-lō'), a resin or balsam obtained from a tree of tropical South America, the *Myrospermum* (*Myroxylon*) *toluiferum* or *peruiferum.* Tolu-balsam becomes hard and may be pulverized, has a pleasant aromatic flavor, and is used in certain medicinal preparations.

Toluca (tō-lō'kȧ), a Mexican city, capital of the State of Mexico, 45 miles s. w. of the federal capital; situated 8500 feet above the sea. The city has a cathedral, a theater, etc., and is noted for its hams and sausages. Pop. 25,940.

Toluol (tol'ū-ol). See *Trinitrotoluene.*

Tomahawk (tom'a-hąk), the light battle-axe of the North American Indians. The head was originally of stone attached to the shaft by thongs, etc., but steel heads were afterwards supplied by American and European traders. The Indians could throw the tomahawk with remarkable accuracy.

Tomahawks of the North American Indians.

Tomato (tu-mā'tō, tu-mȧ'tō; *Lycopersicum esculentum*), a plant belonging to the nat. order Solanaceæ.

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Formerly known also as *Love Apple.* It is a native of South America, but has been introduced into most other warm or temperate countries. It is cultivated for the sake of its fruit, which is fleshy, usually scarlet or orange, irregularly shaped, and is largely used in sauces,

Tomato (*Lycopersicum esculentum*).

stews, and soups, as well as eaten by itself. The plant is a tender, herbaceous annual, with yellow flowers, and has come into high repute, and its cultivation has rapidly extended in many parts of the world. Its general use as food has been chiefly within recent times.

Tomb (tōm), any sepulchral structure, usually a chamber or vault formed wholly or partly in the earth, with walls and a roof, for the reception of the dead. See *Sarcophagus, Burial* and *Funeral Rites.*

Tombac, TOMBAK (tom'bak), an alloy consisting of from about 75 to 85 parts copper, mixed with 25 to 15 parts zinc, and used as an imitation of gold for cheap jewelry. When arsenic is added it forms white tombac.

Tombigbee (tom-big'bē), a river which rises in Tishomingo county, Mississippi, and after an irregular course of 450 miles joins the Alabama River 45 miles above Mobile; the united stream is called Mobile River below the junction. It is navigable for 410 miles from Mobile Bay.

Tomcod (tom'kod), an American name for certain small cod-fishes.

Tomelloso (tom-el-lō'sō), a town of Spain in La Mancha, 50 miles E. N. E. of Ciudad Real. It has lately risen into importance as a center of the wine trade, a great part of the claret and 'cognac' of commerce being here produced. Pop. 13,929.

Tompkins (tom'kins), DANIEL D., vice-president, was born in Westchester Co., New York, in 1774; died in 1825. He was elected to Congress in 1804, was governor of New York 1807-17, and was vice-president of the United States during President Monroe's two terms. He was energetic in the war against England and aided in having slavery abolished in New York.

Tommy Atkins, a name given to the privates of the British army. It is said to have originated in the custom of making out blanks for military accounts with the name, 'I, Tommy Atkins,' etc. Kipling has immortalized it in verse.

Tom of Coventry, or PEEPING TOM. See *Godiva.*

Tomsk, a town of Western Siberia, capital of the government of Tomsk, on the right bank of the Tom, on the great road to China. Manufactures include cloth, leather, and soap; and there is an extensive trade in furs, fish, and cattle, obtained in exchange for articles of European and Chinese manufacture. Pop. 112,083.—The government of Tomsk has an area of 331,159 square miles, and a pop. of 2,412,700. It is watered by the Obi and its tributaries.

Tonawanda (ton-à-won'dà), a town of Erie Co., New York, on the Niagara River, 11 miles S. E. of Niagara Falls. Bridges connect it with North Tonawanda, on the opposite side of Tonawanda creek. It has a large pine lumber trade, engine, boiler, and steel works, and wooden ware factories. An armory is located here. Pop. 8200.

Ton (tun), a denomination of weight equivalent to 20 hundredweights (contracted to *cwt.*), or 2240 lbs. In the United States goods are sometimes weighed by the short ton, of 2000 lbs., the hundredweight being reckoned at 100 lbs.; but it has been decided by act of Congress that, unless otherwise specified, a ton weight is to be understood as 2240 lbs. avoirdupois.

Tone (tōn), in music, the sound produced by the vibration of a string or other sonorous body; a musical sound. Nearly every musical sound is composite, that is, consists of several simultaneous tones having different rates of vibration according to fixed laws, which depend on the nature of the sonorous body and the mode of producing its vibrations. The simultaneously sounding components are called *partial tones;* that one having the lowest rate of vibration and the loudest sound is termed the *prime, principal,* or *fundamental tone;* the other partial tones are called *harmonics* or *overtones*

Tone, THEOBALD WOLFE, Irish patriot, born at Dublin, Ireland, in 1763; educated at Trinity College; studied law in London, and was called to the bar at the Middle Temple (1798). He was an ardent sympathizer with the doctrines of the French revolution, and hav-

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ing promoted the combination of the Irish Catholics and Dissenters he founded the society of United Irishmen in 1791. The discovery of his secret negotiations with France drove him to the United States (1795). He sailed for France in 1796, and became brigadier in Hoche's projected expedition to Ireland. He served in the Bavarian army in 1797, and in 1798 he was captured on board a French squadron bound for Ireland. He was brought to Dublin, and sentenced to death by a court-martial, but committed suicide in prison, November 19, 1798.

Tonga Islands (tong'gâ). See *Friendly Islands.*

Tongataboo (tong-gâ-tâ'bŏ), or TONGA-TABU, one of the most southern of the Friendly Islands, in the Pacific Ocean. It is of coral formation, about 60 miles in circuit. Its soil is extremely fertile. See *Friendly Islands.*

Tongking. See *Tonquin.*

Tongres (toŋ-gr; Flemish, *Tongeren*), a town of Belgium, in the province of Limburg, on the Geer, 12 miles southwest of Maestricht. Tongres has a church (Nôtre Dame) dating from 1240. Pop. 9152.

Tongue (tung), the organ found in the mouth of most vertebrate animals, which exercises the sense of taste, and also assists in speech and in taking food. The name tongue is also given to very different structures in Invertebrata. In man the tongue is attached by its base or root to the hyoid bone, its other extremity being free. The upper surface is convex with a fibrous middle septum, called the *raphé.* The front two-thirds of the tongue are rough, and bear the *papillæ,* in which the sense of taste resides. The posterior third is smooth, and exhibits the openings of numerous mucous glands. The substance of the tongue consists of numerous muscles. The papillæ, which cause the characteristic roughness of the tongue, are of three kinds, *circumvallate, fungiform,* and *filiform.* The largest or circumvallate papillæ number from eight to ten, and occupy the posterior part of the upper surface. They vary from $\frac{1}{10}$th to $\frac{1}{11}$th inch in diameter. The fungiform papillæ are scattered irregularly, the filiform over the front. In structure the papillæ are like those of the skin (which see), and contain capillary vessels and nervous filaments. Numerous *follicles* and *mucous* or *lingual* glands exist on the tongue, the functions of these latter being the secretion of mucus. The nervous supply is distributed in the form of three main nerves to each half of the organ. The *gustatory* nerves and the *glossopharyngeal* branches are the nerves providing the tongue with common sensation, and also with the sense of taste; while the *hypoglossal* nerve invests the muscles of the tongue with the necessary stimulus. The conditions necessary for the exercise of the sense of taste are: firstly, the solution of the matters to be tasted; secondly, the presence of a special gustatory nerve; and thirdly, that the surface of the tongue itself be moist. The top and edges of the tongue are more sensitive to taste than the middle portion. The sense of touch is very acute in the tongue.

Tonic (ton'ik), or KEY-NOTE, in music, the first or fundamental note of any scale, the principal sound on which all regular melodies depend, and in which they or their accompanying basses naturally terminate.

Tonic, in medicine, any remedy which improves the tone or vigor of the fibers of the stomach and bowels, or of the muscular fibers generally. Tonics may be said to be of two kinds, medical and non-medical. Medical tonics act chiefly in two ways: (1) indirectly, by first influencing the stomach and increasing its digestive powers; such being the effect of the vegetable bitters, the most important of which are calumba, chamomile, cinchona bark, gentian, taraxacum, etc. (2) Directly, by passing into and exerting their influence through the blood; such being the case with the various preparations of iron, certain mineral acids, and salts. The non-medical tonics are open-air exercise, friction, cold in its various forms and applications, as the shower-bath, sea-bathing, etc.

Tonic Sol-fa System, in music, a system of notation and teaching which has recently been widely spread among the English-speaking population of the globe, chiefly through the untiring efforts of the Rev. John Curwen, of Plaistow, who obtained the leading features of his plan from Miss Glover, of Norwich. The following is an outline of the system: As of the two relations of musical sounds, those of pitch and key (see *Music*), the latter is of transcendent importance, every means should be taken to impress this fact on the mind and ear of the learner. Any diatonic scale is a natural scale, whether it is founded on the key of C, D, E, or on any other tone thus represented by a letter-name in the ordinary notation. The tonic or key-

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note of the scale is always called **doh**, the second **ray**, the others **me, fah, soh, lah, te**, successively, no matter what the absolute pitch of the sound may be, the initials only being ordinarily used in printed music: thus, **d, r, m, f, s, l, t.** To designate a sound of absolute pitch, the tonic-solfaist uses the first seven letters of the alphabet just as the followers of the other musical system do. Time and accent are marked thus, | : |, or | : : |, or | : ı : |, etc.; the space between the lines and dots indicating the aliquot parts of the bar (the beat or pulse), the line showing the strong accent, the short line the medium accent, and the colon the weak accent. Accidental or chromatic tones are indicated by a change in the vowel sounds of the syllables; thus, **doh, ray, fah,** etc., when sharpened become **de, re, fe,** etc.; and **me, te,** etc., flattened become **ma, ta,** etc. The higher octaves are marked **d|, r|, m|,** etc., the lower **d|, r|, m|,** etc. The last two lines of the psalm tune *French* would therefore be printed thus: —

Key F.

:s|d|:t|l:s|s:fe|s:m|r:d|d:t,|d

In teaching the system great use is made of the *modulator*, a chart which represents pictorially in an upright position the relative places of the notes of the scales, the chromatic notes, the closely related scales, etc.

Tonka (ton'ka), TONGA, the fruit of the *Dipterix odorāta* or *Coumarouna odorāta*, a shrubby plant of

Tonka Bean Plant (*Dipterix odorāta*).

Guiana, nat. order Leguminosæ, suborder Papilionaceæ. The fruit is an oblong, dry, fibrous drupe, containing a single seed. The odor of the kernel is extremely agreeable. It is used in perfumery. Called also *Tonkin bean, Tonquin bean.* See *Coumarin.*

Tonnage (tun'ij), a word originally signifying the number of tons weight which a ship might carry with safety, but now used to denote the gauge of the vessel's dimensions, and the standard for tolls, dues, etc. It is generally assumed that 40 cubic feet shall constitute a ton, and the tonnage of a ship is considered to be the multiple of this ton which most closely corresponds with the internal capacity of the vessel. Formerly the rule was to multiply the length of the ship by the breadth, assume the depth to be the same as the width, multiply by this assumed depth, and divide the product by 94, the quotient being the tons burden. But this mode was found to be both misleading and dangerous; for as harbor and light dues, towage, etc., were charged according to tonnage, shipowners had their vessels built so deep and narrow that they were often unseaworthy. An improved system was introduced in 1835. The depth from the deck to the bottom of the hold is taken at different places, and the breadth is measured at different elevations in depth. If the vessel is a steamer an allowance is made for the space occupied by the engine-room, boilers, coal-bunks, etc. In vessels with a break or poop in the upper deck, the tonnage of this poop space must be ascertained and added to the ordinary tonnage. This system of measurement is in common use in the United States and British countries.

Tonnage and Poundage were duties formerly imposed in England on exports and imports. Tonnage was a duty upon all wines imported. Poundage was an *ad valorem* duty of 12*d.* in the pound on all merchandise imported or exported. They were first levied by agreement, and were granted by parliament to the crown for a limited period in 1370. They were afterwards granted to successive sovereigns until 1787, when they were finally abolished.

Tonquin (ton-kēn'), TONGKING, the most northern province of Anam in Asia; area, between 40,000 and 50,000 square miles. The chief river is the Song-ka. The principal agricultural products are rice, cotton, spices, and sugar; and the province is rich in timber and minerals. The climate is unhealthy. By treaty dated June, 1884, Tonquin was ceded to France. Pop. estimated at from 8,000,000 to 10,000,000. See *Anam.*

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Tönsberg (tuns-bĕrg'), a town in Norway, situated on a fjord branching off from Christiania Fjord. (See *Christiania.*) Many vessels belong to the town. Pop. 8620.

Tonsilitis (ton-si-lī'tus). See *Quinsy.*

Tonsils (ton'sils), in anatomy, two oblong suboval bodies situated on each side of the throat or fauces. Their minute structure resembles that of the closed sacs or follicles of Peyer in the intestine, and their function is not yet understood. See *Palate.*

Tonsure (ton'shör), the name given to the bare place on the heads of the Roman Catholic and Greek priests, formed by shaving or cutting away the hair and keeping it so. The custom of cutting away the hair in token of the dedication of a person to the service of God is mentioned as early as the fourth century. Shaving the hair precedes consecration: it is performed by the bishop. The tonsure admits the subject into holy orders, and the extent of the tonsure increases with the rank held.

Tontine (ton-tēn'), a kind of life annuity, so called from its inventor Tonti, an Italian of the seventeenth century. A tontine is an annuity shared by subscribers to a loan, with the benefit of survivorship, the annuity being increased as the subscribers die, until at last the whole goes to the last survivor, or to the last two or three, according to the terms on which the money is advanced. By means of tontines many government loans were formerly raised in England.

Tooke (tŏk), JOHN HORNE, son of John Horne, a rich poulterer, was born in Westminster, England, in 1736. He was educated at Westminster and Eton, afterwards proceeding to St. John's College, Cambridge. In 1760 he entered the church, and obtained the living of New Brentford. A close friendship with Wilkes ended in a public altercation in 1770 and 1771. The year 1771 also witnessed his contest with Junius, in which, in the general opinion, he came off victor. In 1773 he resigned his benefice to study for the bar (to which from being in orders he was not admitted); and by his legal advice to Mr. Tooke, of Purley, he became that gentleman's heir, and assumed his name. In 1777 he was prosecuted for a seditious libel condemning the American war, and his trial resulted in a year's imprisonment, and a fine of £200. He was a short time member of parliament for Old Sarum. He died in 1812. He wrote several political pamphlets and an ingenious linguistic work entitled *Epea Pteroenta, or the Diversions of Purley.*

Toole (töl), JOHN LAWRENCE, a comedian, born in London in 1833, and was educated at the City of London School. After serving for some time as a clerk he took to the stage, and made his first appearance at the Haymarket in 1852. In 1880 he commenced the management of the Folly Theater, London, which he later on reconstructed and named after himself. In 1874 he visited America, in 1888 he published his *Reminiscences,* and in 1890 made a successful tour in the Antipodes. He was one of the most popular actors on the stage, and inimitable in his personation of semipathetic and semiludicrous characters. Among his most successful impersonations were *Paul Pry, Caleb Plummer* in the *Cricket on the Hearth, Uncle Dick* in *Uncle Dick's Darling,* etc.

Toombs (töms), ROBERT, secessionist, was born in Wilkes Co., Georgia, in 1810; died in 1885. He was elected to the United States Senate in 1853 and 1859, became a leader in the Secession party in Georgia and resigned from the Senate to join the Confederate cause. He was Secretary of State in the Confederate Congress in 1861; Senator, February, 1862; and resigned to become a brigadier-general in the army, but won no distinction as a soldier. He refused to take the oath of allegiance to the United States government after the war and remained rebellious till his death.

Toon (tön), TOONA, the wood of an East Indian tree, the *Cedrēla Toona,* nat. order Cedrelaceæ. It is sometimes called *Indian mahogany,* and also *Indian cedar.* Another species (*C. Australis*) yields the so-called cedar-wood of New South Wales. Toonwood is highly valued as a furniture wood, and is used for door-panels, carving, etc. See *Cedrela.*

Toorgonef. See *Tourguenieff.*

Tooth. See *Teeth.*

Toothache (töth'āk), a well-known affection of the teeth, arising from various causes. Inflammation of the fangs of the teeth is a common cause. If the inflammation is not reduced matter forms, and the result is a gum-boil. Caries is a frequent cause of toothache, the outer part of the tooth rotting away and exposing the nerve. Neuralgic toothache is a purely nervous variety, and may occur either in sound or carious teeth. As a preventive against toothache the teeth should be kept scrupulously clean, and when they show

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symptoms of decay the services of a skillful dentist should be had recourse to. The decay of a tooth is very often arrested by stopping or filling up the cavity.

Tooth-shell. See *Dentalium.*

Toothwort. See *Dentaria.*

Toowoomba (tō-wŏm'bȧ), the principal town of the Darling Downs district of Queensland, Australia, 100 miles west of Brisbane. It occupies one of the best localities in Southern Queensland, in the center of a large agricultural settlement; contains a number of religious, educational, and other public buildings, and many handsome private residences. Wine is produced in the vicinity. Pop. 9137.

Topaz (tō'paz), a mineral, ranked by mineralogists among gems, characterized by having the luster vitreous, transparent to translucent; the color yellow, white, green, blue; fracture subconchoidal, uneven; specific gravity, 3.499. It is harder than quartz. It is a silicate of aluminium, in which the oxygen is partly replaced by fluorine. It occurs massive and in crystals. The primary form of its crystal is a right rhombic prism. Topazes occur generally in igneous and metamorphic rocks, and in many parts of the world, as Cornwall, Scotland, Saxony, Siberia, Brazil, etc. The finest varieties are obtained from Brazil and the Ural Mountains. Those from Brazil have deep yellow tints; those from Siberia have a bluish tinge; the Saxon topazes are of a pale wine-yellow, and those found in the Scotch Highlands are of a sky-blue color. The purest from Brazil, when cut in facets, closely resemble the diamond in luster and brilliance.

Tope (tōp), a popular name for a species of Buddhist monument intended usually to mark some important event. The oldest monuments of this kind are spherical or elliptical cupolas, resting on a circular or rectilinear base, with an umbrella-shaped structure on the apex. See *Dagoba.*

Tope (*Galeus canis*), a European fish of the shark family, attaining a length of six feet.

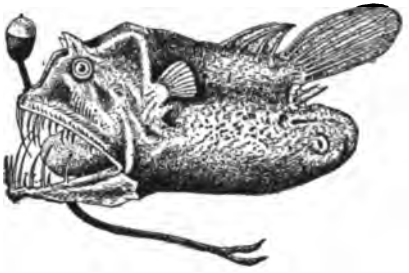
Topeka (tō-pē'kȧ), a city of Kansas, capital of the State and county seat of Shawnee Co., on the Kansas River, 67 miles W. of The Missouri River. It has wide, well-built streets, and contains a handsome State house, State memorial building, State hospital for the insane, reform school, Washburn College, Bethany College, etc. It has extensive railroad shops, flour mills, creameries, packing houses, foundries and other industries. Since 1885 there have been no saloons in the city. Pop. 47,385.

Top-Haneh. See *Constantinople.*

Tophet. See *Gehenna.*

Töplitz. See *Teplitz.*

Torch-fish (tôrch'fish), a deep-sea, pediculate fish which is found off Madeira. The first dorsal spine



Torch-Fish (*Linophryte lucifer*).

carries a luminous bulb above the eyes which resembles a torch.

Torgau (tōr'gou), a strongly fortified town of Prussia, province of Saxony, 45 miles E. N. E. of Merseburg, on the Elbe. Pop. 12,299.

Tormentil (tor'men-til; *Potentilla Tormentilla*), a trailing plant common in healthy or waste places. See *Potentilla.*

Tornado (tor-nā'dō), a term applied to hurricanes and whirlwinds in general, such as are prevalent in the West Indies and on the west coast of Africa about the time of the equinoxes and in the Indian Ocean about the time of changes in the monsoons. They are accompanied with severe thunder and lightning and torrents of rain, but are of short duration and limited area. It is especially applied to the very destructive whirling storms, of very narrow width and brief duration, common on the plains of the Mississippi valley and occasionally appearing beyond this area. Originating in an overhanging cloud, a tornado sends down a funnel-shaped cloud to the ground, the lower portion long and narrow. This is caused by an immensely rapid vertical whirl in the air, capable of twisting off the limbs of great trees and of destroying whatever it touches. The tornado is a traveling storm, its track usually a narrow one, but often several hundred miles in

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length. Death and destruction are left in its path, especially where this passes through a town or city, and tornadoes are greatly feared in the localities subject to their visitations.

Tornea (tor'ne-ō), a seaport of North Finland, Russia, at the mouth of the River Tornea, which rises in Sweden and forms part of the boundary between it and Russia. It has an active trade in timber, fish, pitch, furs, etc., and near by is a hill which tourists ascend at the summer solstice to view the midnight sun. Pop. 1500.

Toronto (tō-ron'tō), one of the chief cities of the Dominion of Canada, capital of the province of Ontario, situated in the county of York, on a small bay on the northwest coast of Lake Ontario, 315 miles w. s. w. of Montreal. Its site is low, but rises gently from the water's edge to a height of above 100 feet. The fine bay in front of the city forms a splendid harbor. The town is regularly built, the streets cross each other at right angles, and are wide, well paved, and in general of handsome architecture. The common material is brick, of a pleasing light color; the public buildings are numerous, and many of them very handsome. The churches most worthy of notice are the Anglican and the Roman Catholic cathedrals, both in the pointed style, the Metropolitan Church (Methodist), and St. Andrew's Church (Presbyterian). Among secular buildings the finest (almost completely destroyed by fire in 1890) is the University of Toronto; the others comprise the lieutenant-governor's residence; the magnificent new Parliament Buildings; Osgoode Hall, the seat of the provincial law courts; the normal school buildings; Trinity College, in connection with the Protestant Episcopal, a highly ornate building; the Upper Canada College; the custom-house; the post-office; the public library; the Government School of Practical Science; and the group of buildings where the annual industrial exhibitions are held. Charitable and benevolent institutions are numerous. Queen's Park, in which the university is situated, is the principal public park. The university is one of the best equipped in America; and besides Trinity College there is Knox College, a Presbysterian theological institution; Wycliffe College, an Anglican theological school; M'Master University, supported by the Baptists; the Upper Canada College; the Provincial Normal and Model Schools; two schools of medicine, two colleges of music, a veterinary college, etc. The industries include iron-foundries and engineering works, agricultural implement factories, breweries, carriage-works, tanneries, soap-works, boot and shoe factories, piano and organ factories, stove foundries, etc. There is a large export trade in flour, grain, live-stock, etc. Toronto was founded in 1794. The latest official census gives a population of 376,538, but the city subsequently took a census through its police department, the returns of which were as follows:

Ward	1	63,704
"	2	60,204
"	3	54,758
"	4	71,860
"	5	72,897
"	6	83,589
"	7	18,395
Total		425,407

Torpedo (tor-pē'do), the name of fishes allied to the rays, forming the type of the family Torpedinidæ, and noted for their power of giving electrical shocks by means of specially-developed electrical organs. The electrical organs consist of two masses placed on each side of the head, and composed of numerous vertical gelatinous columns separated by membranous septa, and richly furnished with nervous filaments. The production of electricity by these fishes is explicable on the ground of the conversion of an equivalent of nerve force into electric force by the electric organ; just as, under other circumstances, nerve force is converted into motion through the muscles. The power of the discharge varies with the health and size of the fish. The torpedoes occur in typical perfection chiefly in the Mediterranean Sea, and in the Indian and Pacific Oceans. A specimen may measure 4 ft. long, and weigh from 60 to 70 lbs.

Torpedo, a name for two distinct classes of submarine destructive agents, namely, torpedoes proper, which are moveable, and are propelled against an enemy's ship; and submarine mines, which lie stationary in the water. Of the first class, called *offensive torpedoes*, there are three principal types: (*a*) the 'automobile,' of which the Whitehead is the best-known form; (*b*) the 'towing torpedo' of Captain Harvey; and (*c*) the 'spar' or 'outrigger' torpedo. The Whitehead, or fish torpedo, may be described as being a cigar-shaped vessel, varying from 14 to 22 feet in length, and from 14 to 21 inches in diameter, the largest weighing 2000 pounds. It is made of specially prepared steel, and is divided into three compartments; the war head contains the charge, consisting of wet guncotton, trini-

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tro-toluol or some other high explosive. This charge is exploded by a priming charge of dry guncotton which in turn is fired by a primer struck by a firing pin carried in the war nose screwed into the head of the torpedo before discharging. The central portion of the torpedo contains the air flask in which air, compressed to 2500 pounds to the square inch pressure, is carried for driving the propelling engine. The after part contains the engine, which is of reciprocating design; the horizontal steering gear which consists of a gyroscope driven by a spiral spring. Any deflection of the torpedo from the line on which it was fired causes the gyroscope to act on a steering engine which moves the horizontal rudders and restores the torpedo to its proper course. The compartment also contains the automatic vertical steering gear.

The range of torpedoes may be as high as 10,000 yards at a speed of 25 knots an hour, but shorter ranges (up to 2500 yards) are more practical and at the shorter ranges speeds up to 50 knots per hour have been attained.

In recent practice the use of torpedoes has been almost entirely confined to submarines, which use a short-range torpedo carrying a very large charge of high explosive. The long range guns of modern battleships and battle cruisers precluding a sufficiently near approach for the use of torpedoes. There are several forms of torpedo operated from shore. Of these the Brennan carries in its interior two drums on which is wound piano wire. The wires pass out of the rear and are attached to powerful engines on shore. These reel the wires off the drums, causing the latter to rotate rapidly and to act upon the propellers. Increased speed in the engines causes the torpedo to move more rapidly, while it can be steered by checking one of the wires, these acting on vertical rudders in the torpedo. The operating range is a mile or more. In the Sims-Edison torpedo there is a 'float' from which the torpedo is suspended, so that it hangs about six feet below the surface. Here an electric motor forms the propelling agency, it being worked from shore through an electric cable which is paid out as the torpedo advances towards its mark. Another form, the Lay torpedo, has compressed carbonic acid gas for its motive power, the working of the engine being controlled by an operator on shore through an electric cable. Both these forms can be exploded by aid of the electric current through the cable, their speed being about 10 or 11 knots per mile. The three wire-controlled forms mentioned can be fully controlled only from a fixed base and are thus fitted to be discharged only from shore, it being evidently a difficult problem to control their movements when discharged from a moving base, as a ship or torpedo-boat. To the latter the Whitehead, or other self-moving form, is well adapted, but it is unlikely that the wire-controlled forms are ever likely to be used except from shore stations. The Whitehead is the form commonly in use. In addition to these types of traveling torpedoes several kinds of fixed torpedoes are in use, known as torpedo mines or submarine mines. These have been for many years effectively used in warfare, and are of two types, the *self-acting* and the *controlled*. The first type is fired either mechanically or electrically. A common mechanical device consists in a set of pins projecting at different angles from the head of the torpedo, any one of which being struck is driven down on a fulminating base. The electrically fired are anchored so as to float 5 to 20 feet below the surface, or may be ground mines with a buoyant float. The electric circuit is completed and the mine fired when float or mine is struck by a passing vessel. The *controlled* mines have wires leading to shore stations. In one form the closing of the circuit at the station does not fire the mine, which must be touched by the vessel to complete the firing circuit. In another form observers watch the movement of the vessel and fire the mine from shore when the ship is over the torpedo. The spar or outrigger torpedo consists simply of a metal case containing the explosive substance (gunpowder, gun-cotton, dynamite, etc.), and fitted with a fuse constructed so that it can be fired at pleasure, or exploded by contact with a ship's side. It is screwed on to a long spar, which is usually fixed in the bow of a swift boat or steam-launch, which endeavors to reach and push the torpedo against the hostile vessel. Stationary torpedoes or submarine mines, such as are placed in channels or coasts to prevent the approach of an enemy's vessels, usually consist of a strong metal case containing an effective explosive, such as gun-cotton, etc., and having a fuse or cap which will explode the charge on the slightest contact; or the explosion may be effected by means of electricity, the operator firing it at will from the shore.

Torpedo-boat. The modern torpedo-boat is a small warship equipped with torpedo tubes as its chief weapons of offense. It must be capable of high speed, able to launch its torpedoes effectually and seaworthy in pro-

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portion to its size. There are two main types, the torpedo-boat destroyer and the torpedo-boat, a smaller type of 200 to 400 tons displacement which has been largely superseded by the destroyer type and relegated to harbor and coast defense. This type is equipped with two or three torpedo-tubes, several three-inch guns and smaller arms. It has a speed of from 25 to 30 knots. The torpedo-boat destroyer is a larger vessel usually of 900 to 1200 tons displacement, though larger vessels in this class have been built. From four to eight torpedo tubes are carried and four 4-inch guns, together with lighter pieces. A destroyer has a speed of about 30 knots per hour and is highly efficient both as a scout and as a defense against submarines. Originally designed for night attacks on larger ships the development of rapid-firing guns and searchlights has been such that operations of this character are rare though destroyers were actively engaged on both sides during naval engagements in the European war (q. v.). The motive power of these vessels is steam generated by fuel oil for the sake of space, economy and convenience. They are driven by high powered quadruple expansive engines operating twin propellors and are sufficiently seaworthy to accompany a battleship fleet on the high seas.

Originally a torpedo-boat consisted simply of a small boat filled with explosive which was itself destroyed in the explosion. Such vessels were used as early as 1585 at Antwerp. Submarine craft carrying torpedoes which were to be affixed to the bottom of the enemy ships followed. Surface craft appeared in the American Civil War, most of them using torpedoes on long spars attached to their bows, but it was not until 1877 when Herreshoff brought out the first torpedo-boat fitted to discharge Whitehead Torpedoes that the principles of the modern vessel of this class were established.

Torpedo Net. A net made up of steel links which is carried on a warship as a defense against submarine torpedoes. The usual practice is to suspend the net from the ends of booms pivoted at the inboard end to the side of the ship. When the ship is at rest these booms are swung out horizontally and the net unfurls, falling to a sufficient depth to protect the hull. When the ship is in motion the net is of no use and the booms are swung in, the net being furled and lying in a shelf.

Torquay (tor-kē'), a seaport and watering-place of England, on the south coast of Devonshire, pleasantly situated on a series of heights and depressions on the north side of Torbay. It is well built, and consists principally of two streets, of several commanding terraces, and of a great number of isolated cottages and villas, with gardens attached. It has several handsome churches, a town-hall, assembly-rooms, etc., and a long pier forming an excellent promenade. The water supply and drainage system are excellent. For invalids its climate in winter is among the best in England. Here William of Orange landed in his invasion of 1688. Pop. (1911) 38,772.

Torque (tork), or TORC, a personal ornament worn by certain ancient nations, as by the ancient Britons, Gauls, and Germans. It consists of a stiff collar, formed of a number of gold wires twisted together, and sometimes of a thin metal plate, generally of gold, and was worn round the neck as a symbol of rank and command.

Torquemada (tōr-kā-mä'da), JUAN DE, a Spanish Cardinal born at Valladolid in 1388; died in 1468. He entered the Dominican Order in 1403 and became noted for his theological writings and took part in many important church councils.

Torquemada, TOMAS DE. See *Inquisition.*

Torre Annunziata (tor'rā a-nōn-tsē-ä'tä), a seaport in the province of Naples, Italy, at the foot of Vesuvius, on the Bay of Naples. Pop. 28,084.

Torre Del Greco (del grā'kō), a seaport of Italy, in the province of Naples, on the Gulf of Naples, at the foot of Mount Vesuvius. The town has suffered much by eruptions of Vesuvius. Pop. 35,328.

Torrens (tor'renz), LAKE, a large shallow salt lake of South Australia, about 90 miles N. of Spencer's Gulf. Length, about 130 miles; average breadth, 20 miles. In the dry season it is merely a salt marsh.

Torrens System, a system of registration of titles to real estate originated by Robert S. Torrens, and first brought legally into operation in South Australia in 1858. Something of the same character had been employed in Austria in 1811 and Hungary in 1855, and Denmark had registered titles by judicial decree as early as 1550. But the Torrens system differed from these earlier forms, and gradually spread through the Australian provinces and to the Fiji and New Guinea Islands. In all

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these the registration of titles was made compulsory on the alienation of crown lands, but was otherwise voluntary. Only fee simple titles could be registered, and the title obtained by registration became indefeasible.

From Australia the system spread to various colonies in America, to Norway, Denmark, Germany and Austria, to England in 1862 and Ireland in 1865. In these, leaseholds for life or for twenty years were included. Absolute, qualified or possessory titles may be registered in England; only absolute titles in Ireland. In Canada the system was adopted in the several provinces at various dates from 1871 to 1906, the act being compulsory on alienation of crown lands, except in British Columbia, and voluntary otherwise except in Ontario, where it is wholly voluntary.

The registration of land titles under statutes usually known as 'Torrens Acts' has been adopted in many parts of the United States. Illinois in 1895 was the first to adopt it. The act was held there to be unconstitutional, but was re-enacted in 1897, the point of objection being removed. The same happened in Ohio, a law being passed in 1896 and repealed as unconstitutional in 1898. It was re-enacted in 1913 when the Constitution was amended. Various other States adopted it, New York, in 1908, being among the latest to do so. The method pursued differs in form in different States, the local procedure varying widely. The claim to the title must be definitely passed on by examiners of title and in the event of a contest, this needs to be passed upon by a court. The decree, when given, becomes absolute and conclusive after a period varying in different States and Territories, ranging from thirty days in Massachusetts and the Philippines to five years in California. The title, when registered is, generally speaking, indefeasible, the exceptions being by private parties for fraud, for varying periods and under varying conditions.

To protect the indefeasible quality of the registered title, provision is generally made for an 'assurance fund,' the proceeds of which are used for the reimbursement of any one injured by reason of the decree upon which the registration was based. Such a person must bring suit within a fixed period, varying from six to ten years in different States. A constitutional amendment submitted in 1915 in Pennsylvania provided that new courts should be established for carrying the system into effect in that State. In the same year a Torrens bill was brought before the Legislature of Michigan. These were the latest States to take action upon the system.

Torres Strait (tor'rez), the strait which separates Australia from New Guinea, being about 80 miles across. It is crowded with islands, shoals, and reefs, rendering its navigation difficult.

Torres Vedras (tor'rŏsh vā'drash), LINES OF, so-called from a village in Portugal 24 miles northwest of Lisbon. These stupendous works, constructed by Wellington in 1810, consisted of two fortified lines, the one 29 miles in length, the other, in the rear of the former, 24 miles in length, forming an impregnable barrier between the French troops and Lisbon. The lines of Torres Vedras saved Lisbon, baffled a well-appointed French army, and gave Wellington a fair opportunity to enter upon offensive operations. See *Spain*.

Torrey (tor'ri), JOHN, botanist, born at New York in 1796; died in 1873. He became a physician in New York and engaged in botanical study, publishing the first volume of his *Flora of the Northern United States* in 1824. With Prof. Gray he produced a *Flora of North America* in 1838. He was professor of chemistry at Princeton College, 1830–54, and botanist of the Geological Survey of New York. In 1860 he presented his herbarium, containing about 50,000 specimens, to Columbia College.

Torricelli (tor-ri-chel'lē), EVANGELISTA, an Italian physicist, born in 1608; died in 1647. Torricelli's name is important in the history of science as the discoverer of the law on which the barometer depends. See *Barometer*.

Torrington (tor'ing-tun), a borough of Torrington township, Litchfield Co., Connecticut, on the Naugatuck river, 26 miles W. by N. of Hartford. Its manufactures are of brass, machinery, needles, automobile accessories, hardware, etc. Pop. 20,000.

Torsion Balance (tor'shun), an instrument employed to measure the intensities of very small forces. It consists of a fine wire, silk thread, or the like, suspended from a fixed point, and having a horizontal needle attached, the force being measured by the resistance to twisting which the filament exhibits when the force (that of attraction, for instance) acts on the needle.

Torsk (*Brosmius vulgāris*), a fish of the cod tribe found in great quantities off the Orkney and Shetland Islands, where it constitutes a consider-

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able article of trade. It is, when salted and dried, a savory stock-fish. It is from 18 to 30 inches long, and is called also *tusk*.

Torso (tor'sō; Italian), an art term signifying the trunk of a statue of which the head and the extremities are wanting. The *torso* of Hercules, in the Belvedere at Rome, is considered by connoisseurs one of the finest works of art remaining from antiquity.

Torstenson (tor'sten-sun), LINNARD, a Swedish general, born in 1603; died in 1651; distinguished in the Thirty Years' war (which see). He was appointed leader of the Swedish army in Germany in 1641, and commanded it for five years.

Tort, in law, denotes injustice or injury. Actions upon torts or wrongs are all personal actions for trespasses, nuisances, assaults, defamatory words, and the like.

Tortoise (tor'tis), the name applied to various genera of reptiles included in the order Chelonia, along with the turtles and their allies. The

Common or Greek Tortoise (*Testūdo Græca*).

distinctive features of the tortoises and other Chelonians consist in the modification of the skeleton and of the skin-structure or scales to form the well-known bony box in which their bodies are inclosed, the upper portion of which is the *carapace*, the lower the *plastron*. The Testudinidæ or typical land-tortoises have short stunted limbs adapted for terrestrial progression; the short toes are bound together by the skin, and have well-developed nails. The carapace is strongly convex, and is covered by horny epidermic plates. The horny jaws are adapted for cutting, or may be divided into serrated processes. The head, limbs, and tail can be completely retracted within the carapace. Though capable of swimming, the tortoises proper are really terrestrial animals, and are strictly vegetable feeders. The most familiar example is the common Greek or European tortoise (*Testūdo Græca*) so frequently kept as a household pet, and which occurs chiefly on the eastern borders of the Mediterranean. These animals sometimes live to a great age (over 100 years according to some), and hibernate through the colder season of the year. They attain a length of 12 inches. A much larger species is the great Indian tortoise (*T. Indica*), which attains a length of over 3 feet and a weight of 200 lbs. Its flesh is reckoned food of excellent quality, as are also its eggs. The box tortoise of India and Madagascar (*Cinyxis arachnoides*) is remarkable for the curious development of the front part of the plastron, which shuts over the anterior aperture of the shell like a lid when the animal retracts itself. In the box tortoise of North America (*Cistūdo Carolina*) the hinder part of the plastron forms a lid. It is included among the Emydæ or terrapins. (See *Terrapin*.) Other genera include the alligator terrapin (*Chelydra serpentina*) of America, also called the 'snapping turtle.' (See *Snapping Turtle*.) The mud or soft tortoises (*Trionychidæ*) occur in Asia, Africa, and North America. They have soft fleshy lips, and no horny plates are developed in the skin. Very frequently also the ribs are not so modified as to form a hard carapace, as in other chelonia. See also *Turtle*.

Tortoise-shell, a name popularly applied to the shell or rather the scutes or scales of the tortoise and other allied chelonians, especially to those of the *Chelonia imbricāta* (the hawk's-bill turtle), a species which inhabits tropical seas. The horny scales or plates which form the covering of this animal are extensively used in the manufacture of combs, snuff-boxes, etc., and in inlaying and other ornamental

Hawk's-bill or Tortoise-shell Turtle (*Chelonia imbricāta*).

work. It becomes very plastic when heated, and when cold retains with sharpness any form it may be molded to in its heated state. Pieces can also be welded together under the pressure of hot irons. It is now largely imitated by horn and cheap artificial compounds.

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Tortoise-shell Butterfly, a name given to two British butterflies, the small tortoise-shell (*Vanessa urticæ*) and the large tortoise-shell (*V. polychlōros*), from the coloring of the wings.

Tortola (tor-tō'lȧ), a British West Indian island, chief of the Virgin Islands; area, 26 sq. miles. It is bare and rugged, rising to a height of 1600 feet. It contains Roadtown, the capital of the group. Pop. 3431.

Tortona (tor-tō'nȧ), a town in Northern Italy, 12 miles east of Alessandria, in the province of Alessandria. The principal edifice is the cathedral (1575). Pop. 7889.

Tortosa (tor-tō'zȧ), a fortified city of Spain, in Catalonia, 48 miles southwest of Tarragona, on the Ebro. There is a cathedral dating from 1374, but the other buildings are unimportant. An active trade is carried on. Pop. 24,452.

Tortugas (tor-tō'gȧs), or DRY TORTUGAS, a group of ten small, low, barren islands belonging to Florida, about 40 miles W. of the most western of the Florida Keys. On Loggerhead Key there is a lighthouse 150 feet high. Fort Jefferson, on one of the islands, was a penal station during the Civil war.

Torture (tor'tūr), the arbitrary and especially excessive infliction of pain judicially, whether to extort confession or to aggravate punishment. Torture has been common in all the nations of modern Europe, and it was also practiced by the ancient Romans. The practice was first adopted by the church in the early middle ages, and when the old superstitious means of discovering guilt (as in ordeal by fire and water) lost their efficacy torture became general in Europe. Though never recognized by the common law of England, it was employed there as late as the reign of Charles I, and in Scotland torture was not wholly abandoned till very near the close of the seventeenth century. Every reader is familiar with the horrid tortures inflicted on those accused of witchcraft, and on many of the Covenanters, by means of thumbkins, the boot, etc., in order to discover alleged hiding-places and the like. In the German States torture continued to be practiced under certain restrictions till the close of the eighteenth century. The chief instrument of torture was the *rack* (which see).

Toru Dutt, a Hindu girl of wonderful precocity, born at Calcutta in 1856; died in 1877. She spent several years in England and France, studied the literature of these countries with avidity, and at eighteen published a critical essay, showing strange maturity, on Leconte de Lisle. She next studied Sanskrit and translated Sanskrit texts into English blank verse. In 1876 she published *A Sheaf Gleaned in French Fields*, being English translations of about 200 French poems. After her death, in her twenty-second year, was published a romance in French, *Le Journal de Mdlle d' Arvers*, and *Ancient Ballads and Legends of Hindustan*.

Tory (tō'ri), a political party name of Irish origin, first used in England about 1679, applied originally to Irish Catholic outlaws, and then generally to those who refused to concur in the scheme to exclude James II from the throne. The nickname, like its contemporaneous opposite, *Whig*, in coming into popular use became much less strict in its application, until at last it came simply to signify an adherent of that political party in the state who disapproved of change in the ancient constitution, and who supported the claims and authority of the king, church, and aristocracy; while their opponents, the Whigs, were in favor of more or less radical changes, and supported the claims of the democracy. In modern times the term has to some extent been supplanted by *Conservative*.

Totara (to-tä'ra; *Podocarpus totara*), a timber-tree of New Zealand, allied to the yew.

Totem (tō'tem), a rude picture of some natural object, as of a bird or beast, used by the American Indians as a symbol and designation of a family or tribe. A similar practice has been found to prevail among other savage peoples, and some theorists have given it a very wide extension on purely conjectural grounds.

Toucan (tou'kan; *Rhamphastos*), a genus of scansorial or climb-

Red-billed Toucan (*Rhamphastos erythrorhynchus*).

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ing birds of the family Rhamphastidæ. These birds inhabit the tropical regions of South America, and are distinguished by a large keeled bill. The bill is about 8 inches long, and its substance is hollowed out into air-cells, thus being comparatively light. The toucans feed on fruits, seeds, insects, etc. The prevailing colors among the toucans are yellow, black, and red. The bill is frequently very brilliantly colored.

Touch, the sense of feeling and the most widely diffused of the senses. It resides in the skin (see *Skin*), and is exercised through certain structures situated in the papillæ of the true skin and connected with terminal filaments of sensory nerves. These structures have some variety of form, and are called tactile cells, tactile corpuscles, compound tactile corpuscles, Pacinian corpuscles, etc. All the kinds are to be regarded as terminal organs of the sensory nerves, acting as the media by which impressions made on the skin are communicated to the nerve fibers. Although the sense of touch is diffused over the whole body, it is much more exquisite in some parts than in others. Experiment shows the tip of the tongue to be the most sensitive surface, the points of the fingers come next, while the red part of the lips follow in order. The neck, middle of the back, and the middle of the arm and thigh are the least acute surfaces.

Touch-me-not. See *Impatiens*.

Touch-needles. See *Touchstone*.

Touch-paper, paper steeped in saltpeter, which burns slowly, and is used as a match for firing gunpowder, etc.

Touchstone, a variety of extremely compact siliceous schist, used for ascertaining the purity of gold and silver. Known also as *black jasper* and *basanite*. It was called *Lydian stone*, or *lapis Lydia*, by the ancients, because found in Lydia in Asia Minor. A series of needles (called *touch-needles*), of which the composition is known, are used for comparison with the article to be tested. When the color of the streak produced by both the needle and the trinket on the stone is the same the quantity of alloy they contain is supposed to be similar.

Touchwood, a soft white substance into which wood is converted by the action of such fungi as *Polyporus igniarius*. It is easily ignited, and continues to burn for a long time like tinder.

Toul (tōl), a town of France, department of Meurthe-et-Moselle, on the Moselle, 12 miles west of Nancy. It is strongly fortified, and has a fine Gothic cathedral, completed in the fifteenth century. Toul was taken in the Franco-German war after a siege of five weeks, September 23, 1870. Pop. 9523.

Toula. See *Tula*.

Toulon-sur-Mer (tō-lōn-sur-mār), a seaport, and after Brest the most important naval station of France, in the department of the Var, situated on a bay of the Mediterranean, 42 miles E. S. E. of Marseilles. It is defended by numerous forts and redoubts, and strong forts and outworks occupy all the heights surrounding the town. Toulon has a cathedral, originally Romanesque, of the eleventh century, a good town-hall, theater, etc., besides the arsenal and other marine establishments, which are on a most extensive scale. The chief harbors and docks are separated from the roadstead by moles, which are hollow and bomb-proof, and lined by batteries, and the storehouses, shipyards, workshops, etc., are most complete. The trade is not important. Toulon suffered severely at the hands of the republicans in 1793 after the withdrawal of the British, whom the inhabitants had voluntarily admitted, and who destroyed here the French republican fleet. Pop. 101,602.

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Toulouse (tö-löz), a town of Southern France, capital of the department of Haute-Garonne, on the Garonne (which is navigable and crossed by three bridges), 160 miles S.E. of Bordeaux. The streets are narrow and irregular, and the houses generally unpretentious. Among remarkable public buildings are the cathedral, the church of St. Sernin, the Hotel de Ville, and the

St. Sernin, Toulouse.

Palais de Justice. Toulouse has university faculties, a Roman Catholic university, a lyceum, and other educational institutions, public library of 60,000 vols., etc. It is the chief entrepôt of the district for agricultural produce and general trade, and is an important industrial center. It is a place of great antiquity, and rose to eminence under the Romans, who embellished it with a capitol, amphitheater, and other edifices of which vestiges still remain. It was the capital of the kingdom of the Visigoths from 419 till 508, when Clovis gained possession of it. Subsequently it became the capital of Aquitaine, was long governed by independent counts, and in the thirteenth century fell a prey to the cruel bigots of the Inquisition (see *Albigenses*), and then was joined to the French crown. The French were defeated by the British under its walls in 1814. Pop. (1911) 149,576.

Touraco (tö-rak'ō), a name of insessorial birds of the genus *Corythaix* or *Turacus*, natives of Africa, and allied to the Scansores, or climbing

Touraco (*Corythaix erythrolophus*).

birds. Their prevailing color is green, varied in some species with purple on the wings and tail. They feed chiefly on soft fruits, and frequent the highest branches of the forest trees.

Touraine (tö-rān), an ancient province of France, bounded north by Maine, east by Orléanais and Berry, south by Berry and Poitou, and west by Anjou and Poitou. It now forms the department of Indre-et-Loire.

Tourcoing (tör-kwaŋ), a town of France, department of Nord, 9 miles N. N. E. of Lille; a well-built thriving manufacturing town, the staple manufactures being woolen, cotton, linen, and silk stuffs, besides dye-works, soap-works, sugar refineries, machine works, etc. Pop. 82,644.

Tourgee (tör-zhā'), ALBION WINEGAR, novelist, born at Williamsfield, Ohio, in 1838; died in 1905. He served through the Civil war, and in 1866 engaged in the practice of law at Greensboro, N. C. He took an active part in the Constitutional conventions of 1868 and 1875, and was judge of the Superior Court, 1868-73. In 1897 he was appointed United States Consul of Bordeaux, France. His best-known novel was *A Fool's Errand*. He wrote also *Bricks Without Straw* and other novels, and some legal works.

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Tourguenieff (tör-gen'yĕf), IVAN SERGEYEVITCH, a celebrated Russian novelist, born at Orel in 1818; died near Paris in 1883. He belonged to a noble and ancient family, and was educated at Moscow, St. Petersburg, and Berlin. In 1842 he obtained an appointment in the ministry of the interior; but having written an article displeasing to the authorities, he was shortly afterwards banished to his paternal estate. For some years he led the life of a country gentleman, gaining an intimate acquaintance with Russian peasant life. His first important publication was translated into English under the title of *Russian Life in the Interior, or the Experiences of a Sportsman.* It was followed by a great number of short tales and dramas, contributed principally to Russian periodicals. His earliest novels were *A Nest of Nobles* (1859), and *On the Eve* (1859). A powerful politico-social novel, *Fathers and Sons*, was published in 1861, and met with much adverse criticism in Russia. His other works include *Smoke*, *Spring Floods*, *Virgin Soil*, etc., all of which have been translated into English. Tourguenieff has been ranked with the greatest masters of fiction.

Tourmaline (tör'ma-lin), a mineral occurring crystallized in three-sided or six-sided prisms, terminated by three-sided pyramids, the primary form being a rhomboid. It scratches glass easily, has a specific gravity of 3, and consists principally of a compound silicate and borate of alumina and magnesia. Tourmaline occurs most commonly in igneous and metamorphic rocks, especially in granite, gneiss, and mica-slate. Some varieties are transparent, some translucent, some opaque. Some are colorless, and others green, brown, red, blue, and black. Red tourmaline is known as *rubellite*, blue tourmaline as *indicolite*, and black tourmaline as *schorl*. The transparent varieties include various well-known jewelry stones, as the Brazilian sapphire, the Brazilian emerald, etc. Prisms of tourmaline are much used in polarizing apparatus, and it possesses powerful electric properties.

Tournai (tör-nā; in Flemish, *Doornik*, dör'nik), a town of Belgium, in the province of Hainaut, on both sides of the Scheldt, which is here crossed by seven bridges and lined by fine quays. The streets are for the most part spacious, with well-built houses. Among the principal edifices are the cathedral, an ancient structure in the Romanesque style; the Church of St. Brice (twelfth century); and the old monastery of St. Martin, now used as a town-house. The leading manufactures are linens, woolens, cottons, and Brussels carpets. Tournai is one of the oldest towns of Belgium, and was anciently the chief town of the Nervii, and afterwards the residence of some of the early Frankish kings. Pop. (1904) 36,744.

Tournament (tör'na-ment), or TOURNEY, a common sport of the middle ages, in which parties of mounted knights encountered each other with lances and swords in order to display their skill in arms. Tournaments reached their full perfection in France in the ninth and tenth centuries, where they first received the form under which they are known to us. They were introduced into England soon after the Conquest by the Normans. *Jousts* were single combats between two knights, and at a tournament there would often be a number of jousts as well as combats between parties of knights. The place of combat was the *lists*, a large open place surrounded by ropes or a railing. Galleries were erected for the spectators, among whom were seated the ladies, the supreme judges of tournaments. A knight taking part in a tournament generally carried some device emblematic of a lady's favor. Tournaments gradually went out with the decline of chivalry.

Tournefort (törn-fōr), JOSEPH PITTON DE, a French botanist, born in 1656. He was educated by the Jesuits, and in 1683 became professor of botany at the Jardin des Plantes, Paris. He visited Greece and Asia Minor, and wrote *Voyage au Levant*. His chief work is entitled *Institutiones Rei Herbariæ* (three vols., Paris, 1700). He died in 1708, being then professor of medicine in the Collége de France.

Tourneur (tör'ner), CYRIL, an English tragic poet, of whose existence we have little certain information beyond the respective dates of his first and last extant works (1600–13). The two plays on which his fame rests are *The Atheist's Tragedy* (1607) and *The Revenger's Tragedy* (1611).

Tourniquet (tör'ni-ket), an appliance employed in the practice of surgery to stop bleeding, its use being only intended to be temporary. Some kind of ligature twisted tight with a stick forms a simple tourniquet.

Tours (tör), a town of France, capital of the department of Indre-et-Loire, on the left bank of the Loire, 145 miles by rail southwest of Paris. The Loire is here crossed by two suspension bridges, a railway bridge, and a fine stone bridge 1423 feet long. Many

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of the streets are spacious and elegant, and there are several historic chateaux in the neighborhood. The principal edifice is the cathedral (Tours being an archbishopric), flanked by two towers, 205 feet high, a fine building begun in the twelfth, completed in the sixteenth, century. Of the old abbey church of St. Martin of Tours only two towers remain. The modern buildings include the Church of St. Joseph, the theater, and the museum. Manufactures include silk, cloth, carpets, chemicals, etc., and there is a large printing and publishing establishment. Tours was known to the Romans by the name of Cæsarodunum. In later times it became famous for its silk manufactures, and had a population of 80,000, when the revocation of the edict of Nantes deprived it of nearly half its inhabitants, a blow from which it has never recovered. In 1870 Tours was the seat of the government of national defense. Pop. 61,507.

Tourville (tör-vil), DE, ANNE HILARION DE COLENTIN, COUNT. a distinguished French admiral, born at Tourville, La Manche, in 1642; died at Paris in 1701. He entered the navy in 1660, became a captain in 1667, and was created vice-admiral in 1689. He defeated a Dutch-English fleet off the Isle of Wight in July, 1690. In 1692 he was ordered to attack a far superior Dutch-English fleet off La Hogue, and was defeated. He was created a marshal in 1693, and in 1694 destroyed a Dutch and English trading fleet off Cape St. Vincent.

Toussaint-Louverture (tö-saṇ-lö-ver-tür), a distinguished negro, born a slave in the Island of Hayti in 1743. After the insurrection of 1791 Toussaint served in the army of the blacks, and later rose to be their leader. He displayed great military and political ability, and in 1796 the French government appointed him general-in-chief of the troops in San Domingo. After a severe struggle with insurrectionary movements he assumed supreme civil authority, and in 1801 was completely master of the island. He was appointed president for life of the Republic of Hayti, and under his vigorous government the commerce and agriculture of the island began to revive. But Napoleon did not choose to see him independent, although professedly loyal to France, and sent a powerful expedition to subdue Toussaint, who was forced to surrender. After a vigorous resistance he was seized and sent to France, where he died in prison, on the 27th of April, 1806.

Tower (tou'er), CHARLEMAGNE, diplomat, was born at Pottsville, Pennsylvania, in 1848. He was graduated at Harvard in 1872; was admitted to the bar in 1878; became an officer and director in several corporations; and in 1897 was appointed Minister to Austria-Hungary. In 1899 he was made Ambassador to Russia, and in 1902 to Germany, returning in 1908. He is the author of *The Marquis de La Fayette in the American Revolution.*

Tower of London, a celebrated ancient fortress in London, consisting of a collection of buildings of various ages on a somewhat elevated position on the north bank of the Thames, outside the old city walls. It covers about 13 acres, and is surrounded by a battlemented wall flanked with massive towers, and encircled by a moat. There is also an inner line of circumvallation broken by towers, and interspersed with other buildings. In the center is the White Tower, the keep of the old fortress, around which are grouped the chapel, the jewel-house, barracks, and other buildings. The Tower was a first-class mediæval fortress, and served at once as a palace, a prison, and a place of defense. The White Tower was built by Gundulf, bishop of Rochester, for William I, in 1078. It was successively strengthened by various English sovereigns. The regalia, consisting of the royal crowns, scepters, etc., are now kept and exhibited in the jewel-house. The armory contains a fine collection of armor and weapons. In the part called the Bloody Tower the two young princes, sons of Edward IV, were murdered. The Tower is now chiefly used as an arsenal, and has a small military garrison of the yeomen of the guard. It is governed by a constable and deputy-constable. The governorship is still a post of distinction. The White Tower was slightly damaged on January 24, 1885, by an explosion, the work of Irish dynamitards.

Town. See *City.*

Town-clerk, the clerk to a municipal corporation, elected by the town-council. In the United States, an officer who acts as custodian of civic or municipal records, and enters all the official proceedings of a city, town, or borough. In England his chief duties are to keep the records of the borough and lists of burgesses and to take charge of the voting papers at municipal elections.

Town-council, the governing body in a municipal cor-

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poration elected by the legal voters. The principal duties of this body are to manage the property of the city, impose taxes for public purposes, pass laws for the good government of the town, for the prevention of nuisances, and the like.

Townshend (toun'zend), CHARLES, second viscount, an English statesman, born at Rainham, Norfolk, in 1674; succeeded to the peerage in 1687, and took his seat as a Whig in the House of Peers in 1695. After acting as a commissioner for arranging the Scottish Union (1706), he was joint plenipotentiary with Marlborough in the conference at Gertruydenburg (1709), and then, as ambassador to the states-general, signed the Barrier Treaty. For this he was censured by the House of Commons, and declared an enemy to the queen and kingdom. He thereupon entered into communication with the Elector of Hanover, who, on his accession as George I, appointed Townshend secretary of state, 1714. In 1717 he became lord-lieutenant of Ireland; and he was again secretary of state from February, 1721, to May, 1730, when he retired on account of differences with his brother-in-law and colleague, Sir Robert Walpole. He died in 1738.

Townshend (toun'zend), CHARLES, grandson of the above, born in 1725; entered the House of Commons in 1747, and became a commissioner of trade and plantations in 1749. He was a lord of the admiralty in 1754, member of the privy-council in 1756, secretary of war in 1761–63, chancellor of the exchequer in 1766. He supported Granville's stamp-act (1765), and introduced the celebrated resolutions for taxing the American colonies (June 2, 1767). He died in 1767. From so often changing his political opinions he was known as the 'weathercock,' but he had a great reputation for oratory and ready wit.

Township (toun'ship), a subdivision of a county, without reference to its population. Townships in the central and western United States are frequently square areas of six miles to a side. In England, a township is a division of a parish which has a constable, and may have overseers of the poor belonging to itself.

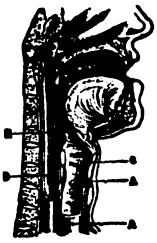
Townsville (tounz'vil), the chief municipality of North Queensland, Australia, on Cleveland Bay, about 850 miles N. W. of Brisbane. Being the port of an immense territory, including several gold-fields and a large area of pastoral country, there is a large shipping trade. Extensive harbor improvements have been made. Pop. 12,717.

Toxicology (tok-si-kol'ō-ji), the science of poisons and antidotes. See *Poison*.

Toxotes (toks'o-tēz), an East Indies genus of fishes, with two species. See *Archer-fish*.

Tracery (trā'se-ri), the ornamental stonework in the head of a Gothic window, arising from the mullions, and presenting various combinations of curved or straight lines.

Trachea (trā'ke-a), or WINDPIPE, in anatomy, the name given to the tube extending from the larynx (which see) down into the chest to a point opposite the third dorsal vertebra, where the tube divides into two chief divisions or bronchi (which see), one of which supplies each lung with the air necessary for respiration or breathing. The trachea in man is of cylindrical form, about 4½ inches long, and from ¾ to 1 inch in diameter, and is composed of from sixteen to twenty rings or zones of gristly or cartilaginous nature, separated and connected by fibrous tissue. Each cartilage forms an imperfect ring, being unclosed behind, and having the gristly edges merely joined by fibrous membrane. The windpipe is lined by delicate mucous membrane which is covered by epithelial cells provided with delicate vibratile processes or *cilia*. All mammals, reptilia, and birds possess a trachea, but some amphibia want this organ; the lungs in such cases springing directly from the larynx. The cut shows the trachea A A, the epiglottis B, the larynx C, and the œsophagus D.



Trachea — Section through part of face and neck.

Tracheotomy (trā-ke-ot'o-mi), LARYNGOTOMY, or *Bronchotomy*, an operation in which an opening is made into the trachea or larynx, as in cases of suffocation.

Trachoma (tra-kō'ma), a specific contagious form of inflammation of the conjunctiva of the eye. It is associated with filthy conditions and is common in Egypt, Arabia and parts of Europe. Individuals suffering with the disease are denied entry to the United States.

Trachyte (trā'kīt), a compact volcanic rock, breaking with a rough surface, and often containing crys-

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tals of glassy felspar, and sometimes hornblende and mica. This rock is extremely abundant among the products of modern volcanoes.

Tracing-paper (trā'sing), transparent paper which enables a drawing or print to be clearly seen through it when laid on the drawing, so that a pen or pencil may be used in tracing the outlines of the original. It is prepared from smooth unsized white paper rendered transparent by a varnish made of oil of turpentine with an equal part of Canada balsam, nut-oil, or other oleo-resin.

Tractarianism (trak-tā'ri-an-izm), the name usually given to a system of religious opinion and practice promulgated within the Church of England in a series of papers entitled *Tracts for the Times*, and published at Oxford between 1833 and 1841.

Traction-engine. See under *Steam Engine.*

Tracy (trā'si), BENJAMIN FRANKLIN, statesman, born at Oswego, New York, in 1830. He became brevet brigadier-general in the Civil war, United States district attorney in 1866, and judge of the New York Court of Appeals in 1889. In 1889 he became Secretary of the Navy under President Harrison. He was an unsuccessful candidate for mayor of New York in 1897. Died Aug. 6, 1915.

Trade, BOARD OF. See *Board.*

Trade Dollar, a silver dollar of the United States, containing 378 troy grains of silver and 42 troy grains of alloy. Dollars of this description, issued under Act of Congress of Feb. 12, 1873, were legal tender to the amount of $5. Those issued under the Act of July 22, 1876, possessed no legal tender power. The trade dollars were intended for trade with countries doing business on a silver basis; hence the name.

Trade-mark, a peculiar mark used by a manufacturer to distinguish his own productions from those of other persons. Such marks can now be registered and protected in all the more important countries, and between these also there is a general reciprocity as to protection. Regarding trade-marks many nice questions may arise, and it is not easy to define what constitutes a valid trade-mark. A mere descriptive title or a geographical name will not constitute a proper trade-mark; what it is best to select is some invented word or words, or a word or words having no reference to the character or quality (though suggestive of excellence), some distinctive device, figure, emblem, or design, or a written signature or copy of such. Any mark or name calculated to mislead as to the real nature or origin of the goods will be vitiated. In the United States trade-marks are registered at the Patent Office, at a fee of $25, the right running for thirty years.

Tradescantia (trad-es-kan'she-a), a genus of lily-like plants, nat. order Commelynaceæ. The species are natives of America and India, and many of them are cultivated as ornamental plants in flower gardens. They are well marked by their three sepals, three petals, three-celled capsule, and filaments clothed with jointed hairs. *T. virginica*, a United States species, is known by the name of *spiderwort*. It has succulent stems, shining grass-like leaves, and blue or purple flowers, and it is common in the flower borders of gardens. Other species are cultivated.

Trades-unions. A trade society has been defined as 'a combination of workmen to enable each to secure the conditions most favorable for labor'; and although trades-unions, as they are generally called, almost always have other objects in view in addition to that specified in the definition, that object is their distinguishing one. Combinations of this sort in Great Britain are considerably more than three centuries old, for there is a statute of the year 1548 expressly directed against them. They are looked upon as the lineal descendants of the mediæval gilds. Trades-unions generally endeavor to regulate the prices and the hours of labor, and in many cases the number of men engaged by an employer, the number of apprentices which may be bound in proportion to the journeymen employed by a master, and the like. As accessories these unions may collect funds for benefit societies, and undertake the insurance of tools, libraries, and reading-rooms; but their fund, to which every member must regularly contribute a stated sum, is principally reserved for enabling the men to resist, by strikes and otherwise, such action on the part of the employers as would tend to lower the rate of wages or lengthen the hours of labor. That trades-unions enable the men to benefit by the state of trade more than they otherwise would have done would appear from the fact that the worst-paid trades are those without unions. Trades-unions are also said to have furthered the safety of the laborer by producing beneficial modifications of the conditions in which he works. Some hostility against trades-unions has been

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produced by the outrages of a more or less serious nature of which some of the unions, or members of them, have been guilty, such outrages being directed against the property of employers, or against the persons and tools of non-union men. The Trades Unions of the United States originated within the last century, and have united into general organizations embracing large numbers of workmen. The oldest of these, the Knights of Labor, originated in 1869. The American Federation of Labor, organized in 1887, includes the great bulk of the local unions, both of the United States and Canada. It has a membership of about 2,000,000, representing about 27,000 local unions in the two countries. Britain has also a general Federation of Trades-Unions and similar organisations exist in other parts of Europe and elsewhere. See *Labor Organizations*.

Trade-wind, one of those perpetual or constant winds which occur in all open seas on both sides of the equator, and to the distance of about 30° north and south of it. On the north of the equator their direction is from the northeast (varying at times a point or two of the compass either way); on the south of the equator they proceed from the southeast. The origin of the trade-winds is this:—The great heat of the torrid zone rarefies and makes lighter the air of that region, and in consequence of this rarefaction the air rises and ascends into the higher regions of the atmosphere. To supply its place colder air from the northern and southern regions rushes towards the equator, which, also becoming rarefied, ascends in its turn. The heated air which thus ascends into the upper regions of the atmosphere being there condensed flows northward and southward to supply the deficiency caused by the under-currents blowing towards the equator. These under-currents coming from the north and south are, in consequence of the earth's rotation on its axis, deflected from their course as they approach the equatorial region, and thus become northeast and southeast winds, constituting the trade-winds. The belt between the two trade-winds is characterized by calms, frequently interrupted, however, by violent storms. Trade-winds are constant only over the open ocean, and the larger the expanse of ocean over which they blow (as in the Pacific) the more steady they are. In some places the trade-winds become periodical, blowing one-half of the year in one direction and the other half in the opposite direction. See *Monsoon*.

Tradition (tra-dish'un), in its general application, is any knowledge handed down from one generation to another by oral communication. It plays a very important part in the Jewish and Roman Catholic churches. In theology, the term is specifically applied to that body of doctrine and discipline, or any article thereof, supposed to have been put forth by Christ or his apostles, and not committed to writing, but still held by many as an article of faith.

Traducianism. See *Creationism*.

Trafalgar (commonly tra-fal'gär, more correctly tra-fal-gär'), a low and sandy cape on the southwest coast of Spain, at the northwest entrance of the Strait of Gibraltar. The famous naval battle in which Nelson lost his life, after defeating a larger French and Spanish fleet under the command of Villeneuve and Gravina, was fought off this cape, October 21, 1805. The Franco-Spanish fleet lost 19 ships out of 33.

Tragacanth (trag'a-kanth), a variety of gum familiarly termed gum-dragon or gum-tragacanth. It is the produce of several species of the genus *Astragălus*, leguminous plants natives of the mountainous regions of Western Asia. In commerce tragacanth occurs in small twisted thread-like pieces, or in flattened cakes, in color whitish or yellowish, devoid of taste or smell. It is demulcent, and is used in coughs and catarrhs, and to make lozenges and pills. It is employed also in calico-printing.

Tragacanth (*Astragălus gummifer*).

Tragedy (traj'e-di), a dramatic poem, representing an important event or a series of events in the life of some person or persons, in which the diction is elevated and the catastrophe melancholy. Tragedy originated among the Greeks in the worship of the god Dionysus or Bacchus. See *Drama*.

Tragopan (trag'ō-pan), a name of certain beautiful birds of the genus *Ceriornis*, and of the family Phasianidæ, closely allied to the common

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fowl. *C. satyra*, a common species, is a native of the Himalayas. The plumage is spotted, and two fleshy protuberances hang from behind the eyes. When the bird is excited it can erect these protuberances until they look like a pair of horns. A large wattle hangs at either side of the lower mandible.

Tragopogon. See *Goats'-beard.*

Train-bands, a force partaking of the nature of both militia and volunteers, instituted by James I and dissolved by Charles II. The term was afterwards applied to the London militia, from which the 3d regiment of the line originated, and in which the renowned John Gilpin was a captain.

Trains, ARMORED, railway trains of which the engine and carriages are protected from small-arm fire by armor in the shape of high parapets of iron or steel plating. Loopholes in the armor allow the men to use their rifles.

Training Colleges. See *Normal Schools.*

Trajan (trā'jăn), in full, MARCUS ULPIUS TRAJANUS, a Roman emperor, born in Spain 52 A.D., was the son of Trajanus, a distinguished Roman commander under Vespasian. He served against the Parthians and on the Rhine, where he acquired so high a character that Nerva adopted him and created him Cæsar in 97. Nerva died in 98, and Trajan, who was then in Germany, peaceably succeeded to the throne. He made peace with the German tribes, and proceeded to introduce enlightened measures of reform into the public service. One of his greatest military achievements was his defeat of the Dacians, and the reduction of Dacia to a Roman province. It is supposed that it was in commemoration of this war that he erected at Rome the column which still remains under his name. In 103 he wrote the famous epistle to Pliny, governor of Pontus and Bithynia, directing him not to search for Christians, but to punish them if brought before him; and on no account to listen to anonymous charges. For some years Trajan occupied himself with the work of administration, but in 114 he set out on an expedition against the Parthians which resulted in the reduction of Armenia to a Roman province. He died in Cilicia in 117 A.D., after having nominated Hadrian as his successor. He is said to have been sensual in his private life, but his good qualities as a ruler were such that even 250 years after his death senators greeted a new emperor with the wish that he might be more fortunate than Augustus and better than Trajan.

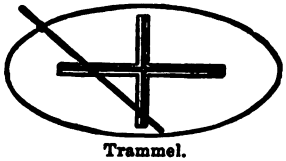
Trajan.

Trajan's Column. See *Rome.*

Trajan's Wall, a fortified line in the Dobrudsha (Roumania), extending E. from the Danube to Kustendji on the Black Sea, a distance of 37 miles. It is a double, in some places a triple, earthwork on the south side of a natural fosse consisting of a narrow marshy valley. Another wall of the same name, built by a Roman legion, 105-155 A.D., extends from the Pruth E. to the Black Sea.

Tralee (trâ-lē'), a town and seaport in Ireland, in the county of Kerry, on the river Lee, 55 miles southwest of Limerick. It has an active trade in farm produce. By means of a canal vessels up to 300 tons can discharge their cargoes within 100 yards of the town. Pop. 9687.

Trammel (tram'el), an instrument for drawing ovals, used by joiners and other artificers. One part consists of a cross with two grooves at right angles; the other is a beam-compass



Trammel.

carrying two pins which slide in those grooves, and also the describing pencil.

Tramp, the colloquial name for vagrants or wanderers. The term 'tramp' in general use means a wandering, disorderly person, without visible means of support, though vagrant in a wider sense is applied to many persons who cannot be classed as tramps. In England laws have been enacted for many centuries for the regulation of vagrancy. In the United States tramps were formerly so few that before the Civil war they received little attention. Later, partly owing to the disbandment

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of the armies, the scattering of the camp-followers, the disastrous times of 1873, and the increase of foreign vagrants by immigration, they increased so largely, besides becoming so dangerous and vicious in character, that the evil was so great as to attract public attention. Now many of the states have promulgated vagrancy laws to abate the nuisance. It has been found, however, that severe treatment is not a great deterrent.

Tramway (tram'wā), the English name for street railways, which see; also *Electricity* and *Trolley*.

Trance (trans), a condition resembling sleep, in which consciousness and many of the vital functions are suspended, and during which the action of the heart is diminished and the breathing reduced. The subjects of trance are usually hysterical, and in some cases it is induced by exhausting disease or emotional disturbance. In this condition the face is pale, the limbs relaxed, the mental functions are in abeyance, no effort at rousing will produce a return to consciousness, and this state may last from a period of several hours to many weeks or months. When the trance lasts for a lengthy period food is taken in a mechanical way at intervals by the sleeper. Most cases recover. The term is also applied to a sort of ecstatic state in which some persons are said to fall.

Trani (trä'nē), a seaport in South Italy, province of Bari, on the Adriatic, 26 miles northwest of Bari, with old walls and bastions, and a cathedral. Pop. 34,688.

Tranquebar (tran-kwe-bär'), a seaport in the district of Tanjore, Madras Presidency, India, formerly a Danish settlement and a busy port. Pop. 13,142.

Transbaikalia (trans-bī-kā'li-ā), a Siberian province, E. of Lake Baikal; area, 240,780 sq. miles. It has an elevated, well-watered surface, and climate dry and extreme both in summer and winter. Agriculture and trade are limited; gold is found to some extent. Pop. 742,200.

Transcaspian Region (trans-kas'pi-an), a territory to the E. of the Caspian recently annexed by Russia. It has an area of 220,000 sq. miles, mostly uninhabited desert, and is traversed by the Transcaspian Railway, which connects Samarcand with the Caspian Sea.

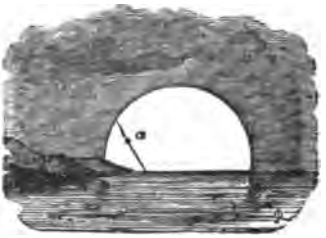
Transcaucasia (trans-kg-kā'shi-a), that part of the lieutenancy of the Caucasus which lies S. of the main Caucasus ridge, and which includes the governments of Kutais, Tiflis, Elisabethpol, Erivan, Kars, etc.

Transcendental (trans-sen-den'tal), a term applied in the system of philosophy founded by Kant to all those principles of knowledge which are original and primary, and which are determined *à priori*, such as space and time. They involve necessary and strictly universal truths, and so transcend all truth derived from experience, which must always be contingent and particular. The term *transcendentalism* is now generally used in a sense not very different from mysticism, or for that which is vague and illusive in philosophy. In mathematics the term is applied to quantities that cannot be expressed in ordinary algebraic terms.

Transept (tran'sept), in architecture, the transverse portion of a church which is built in the form of a cross; that part between the nave and choir which projects externally on each side, and forms the short arm of the cross in the general plan. See *Cathedral*.

Transfusion (trans-fū'shun), the transmission of blood from the veins of one living animal to those of another, as from one of the lower animals into a man, or from man to man, with the view of restoring the vigor of exhausted subjects. This operation is a very old one, but seems to have generally ended in failure until about 1824, the chief cause of failure probably being the want of due precautions to exclude the air during the process. It is now occasionally resorted to as a last measure in cases of great loss of blood by hemorrhage, especially in connection with labor.

Transit (tran'sit), in astronomy, (*a*) the passage of a heavenly body across the meridian of any place,



TRANSIT OF MERCURY.
a, Mercury. The dotted line shows the path.

a phenomenon which is usually noted by a transit instrument. The determination of the exact times of the transits of the

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heavenly bodies across the meridian of the place of observation enables the astronomer to ascertain the differences of right ascensions, the relative situations of the fixed stars, and the varied motions of the sun, planets, and comets, in respect to the celestial meridians. (*b*) The passage of one heavenly body over the disk of a larger one; but the term is chiefly restricted to the passage of the inferior planets, Mercury and Venus, over the sun's disk. The transits of Venus are of great importance in astronomy, as they afford the best means of determining the sun's parallax, and consequently the dimensions of the planetary system. These transits are of rare occurrence, four taking place in 243 years, at intervals reckoning from the transit of 1874, in the order of 8, 122, 8, and 105 years, which gives the transit years 1882 (Dec. 6), 2004, 2012, 2117. The transits of Mercury occur more frequently, but they are of far less astronomical interest, as they cannot be used for the same purpose, the planet being too distant from us.

Transit Instrument, an important instrument adapted for observing the exact time of the passage of heavenly bodies across the meridian. (See *Transit.*) It consists essentially of a telescope fixed at right angles to a horizontal axis, which latter has its ends directed exactly to the east and west points of the horizon, so that the line of collimation or optical axis of the telescope may move in the plane of the meridian. The instrument is susceptible of certain nice adjustments, so that the axis can be made perfectly horizontal, and at right angles to the plane of the meridian, in which plane the telescope must move. It is generally used in connection with the mural circle (which see).

Transkei (trans'kī), a division on the east coast of Cape Colony, Africa, extending southward from the Kei River to Tembuland, and bordering on the Indian Ocean; area, 2552 sq. miles. The interior rises to an elevation of about 9800 feet. It is a very fertile region, with dense forests. Many cattle and sheep are raised. Copper and coal are found. Pop. 177,647; 1700 whites.

Transmigration of the Soul, or METEMPSYCHOSIS, (met-emp-si-kō'sis), the passage which, according to the belief of many races and tribes at all times, the soul after the death of the body makes through the bodies of the lower animals or other human bodies, or, it may be, through plants or inanimate objects. In the teaching of the Brahmanic Hindus it has its foundation in the belief of the connection of all living beings, and of the gradual purification of the spiritual part of man and its return to the common source and origin of all things — God. The Buddhists accept a similar doctrine, but with them the ultimate goal of the soul is not absorption by the Deity, but annihilation, Nirvana. Transmigration also formed part of the teaching of the Egyptian priests. The doctrine probably passed from Egypt into Greece, where it was never generally current, but was confined to the mysteries and some philosophic systems.

Transvaal (trans-väl'), now VAAL RIVER COLONY, was originally formed by part of the Boers, of Dutch descent, who left Cape Colony in 1836 for Natal, and quitted that colony on its annexation by Great Britain in 1845. Its independence was recognized by the British government in 1852. It lies north of the Vaal River and south of the Limpopo River, and is bounded on the west by Bechuanaland, east by Portuguese territory, Swaziland, and Zululand, south by Natal and the Orange River Colony. Area, 114,360 sq. miles. Its population is 1,686,212, of whom about 300,000 are whites. Its largest town is Johannesburg, with a population of 237,220. This city is a gold-mining center. The region is a plateau of from 1500 to 6000 feet elevation. It is well suited to agricultural and stock-raising pursuits, and large numbers of farm animals are kept. The great wealth of the region is in its mineral resources, notably gold, diamonds, and coal. The gold mines have the greatest output in the world, and the diamond product is of considerable value.

In 1877, owing to a war with the Kaffirs, a British force assisted the Boers and the territory was annexed to Great Britain. Troubles ensued, the Boers rose in arms in 1880 and defeated the British in 1881 at Majuba Hill. Their independence was then recognized, though their foreign relations remained under British supervision. The rapid development of the gold-mining industry brought new elements of difficulty into the problem, the Boers refusing to the multitude of foreign miners who sought their country any political privileges, while laying upon them the great burden of taxation. The discontent of the Uitlanders (outlanders) led, in 1895, to an invasion of the republic by a party of British settlers under Dr. Jameson. This was easily suppressed by the Boers, and the troubles grew more prominent

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as years went on until in 1899 a petition, signed by 21,000 British subjects, was sent to the queen pointing out their grievances. The negotiations which followed proved ineffective, and conditions grew so strained that the British government called out 25,000 of the reserve forces. In reprisal the Boer government demanded that all troops on the frontier should be instantly withdrawn and that no more troops should be sent to South Africa. This demand not being complied with, a Boer force at once invaded Natal, where they invested Ladysmith, and for a time had much success. In 1900 the tide of the war turned, the British forces increasing until nearly 250,000 men were in the field under Lord Roberts. Ladysmith and the other besieged towns were relieved, and though the Boers fought with great courage and skill they were so largely outnumbered that their case grew hopeless. Bloemfontein, Johannesburg, and Pretoria were occupied, and the Transvaal Republic, with the Orange Free State, which had joined it in the war, were proclaimed British colonies. President Kruger fled to Europe, where he sought in vain for European intervention, and the war on the part of the Boers became a series of guerilla raids, continued until but a handful of fighting men were left. In May, 1902, a treaty of peace was signed, and the two republics passed under British rule, the terms granted them being very favorable. For the restoration and restocking of the Boer farms, which had been ruined during the war, £3,000,000 were given by the British government, which also agreed to make loans, free of interest for two years, for the same purpose, while no special tax was to be laid on the colonies to pay the expenses of the war. The total cost of the war to Great Britain was about £233,000,000 or $1,165,000,000. In the years that have succeeded these events the possessions of the suffrage by the Boers has, in a measure, given them possession of the country again, they forming a majority of the inhabitants, this resulting in the election of one of their late leaders to the chief post of authority in the colony. The Transvaal and Orange Free State now form States of the Union of South Africa, organized in 1910.

Transylvania (tran-sil-vā'ni-a; German, *Siebenbürgen;* Hungarian, *Erdely*), a grand-principality belonging to the crown of Hungary, forming the southeastern portion of the Austrian Empire; area, 21,213 square miles. The surface is mountainous, the Carpathian chain covering its southern and eastern frontier, and sending out numerous ramifications into the interior. The chief rivers are the Aluta or Alt, the Maros, and the Szamos, all flowing directly or indirectly into the Danube. The forests are extensive and valuable; the vine flourishes everywhere, and the crops include maize, wheat, rye, hemp, flax, tobacco. The minerals are important, and include gold, silver, copper, lead, coal, salt and iron. The chief towns are Hermannstadt, Kronstadt, Bistritz and Szamos-Ujvar. Education is in a very backward state. The population (2,456,838) is very mixed, including Roumanians, Magyars, Germans, Gypsies, Jews, Bulgarians and others. Since 1867 it has been an integral part of the Kingdom of Hungary.

Trap, a term rather loosely and vaguely applied by the earlier geologists to some or all of the multifarious igneous rocks that belong to the palæozoic and secondary epochs, as distinct from granite on the one hand, and the recent volcanic rocks on the other. Trap-rocks often assume a terraced appearance, whence their name from *trappa*, the Swedish for a stair. Their composition may be described as consisting chiefly of felspar and hornblende. Trap-rocks of crystalline structure are distinguished as greenstones, basalts, clink-stones, compact felspar, and felspar porphyries; while the softer and more earthy varieties are known as claystones, claystone porphyries, amygdaloids, trap-tuffs, and wackes. *Basalt* (which see) is the most compact, the hardest, and the heaviest of the trap-rocks. The hill scenery of trappean districts is often picturesque.

Trapa (trā'pa), a genus of plants, order Onagraceæ, consisting of several species, floating in water, and having long jointed root-stocks, with hair-like roots. They yield edible seeds. *T. natans* of Central and Southern Europe has received the name of water-caltrops from its four-horned fruits. These, which are called Jesuits'-nuts in Italy, and water-chestnuts in France, are ground into flour and made into bread in the south of Europe. *T. bispinōsa* yields the Singhara-nuts of Northern India.

Trapani (trä'pā-nē; ancient, *Drepănon* or *Drepănum*), a fortified seaport town in Sicily, capital of the province of the same name, 47 miles W. S. W. of Palermo, on a peninsula shaped like a sickle, and hence its ancient name, from the Greek *drepanē*, a sickle. It has a cathedral of no great merit, lyceum, nautical school, etc. There is a good trade, and the fisheries are extensive. At a short distance E. N. E. of the

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town is Mount San Giuliano, the ancient Eryx. (See *Eryx*.) Pop. 68,986.

Trap-door Spider, a name given to certain spiders that have the habit of constructing tubular dwellings in the ground, sometimes a foot or more in depth, and an inch or so in diameter, closed by a sort of hinged door. They belong to several genera, and are found in Southern Europe, Western United States, and elsewhere. The dwelling is lined with the silky substance spun by the insect, and the hinge of the door is formed of the same, the door itself being constructed sometimes of earthy particles connected by threads, sometimes of leaves, etc. Some species construct nests that have a main tube and one or more branches, the latter having a door where they join the main tube. *Cteniza Sauvagei* of Corsica, *Nemesia* (*Mygale*) *cæmentaria* of S. W. Europe, and *Cteniza Californica* of the United States are examples.

Trap-door Spider and Nest.

Trapezoid (trap'e-zoid), or TRAPEZIUM, a quadrilateral figure of unequal sides, and consequently unequal angles. It is different from a parallelogram, which is a quadrilateral figure with the opposite sides equal.

Trappe, LA, TRAPPISTS. See *La Trappe*.

Trasimenus, LACUS. See *Perugia, Lago di*.

Trass, a volcanic production, consisting of ashes and scoriæ thrown out from the ancient Eifel volcanoes, on the Rhine, near Coblentz. It is equivalent, or nearly so, to the puzzolana of the Neapolitans, and is used as a cement. The same name is given to a coarse sort of plaster or mortar made from several other argillo-ferruginous minerals, used to line cisterns and other reservoirs of water.

Traun (troun), LAKE OF, a small but beautiful lake in Upper Austria near the town of Gmunden. The river Traun passes through the lake and enters the Danube.

Trautenau (trou'te-nou), a town of Northern Bohemia, in the valley of the Riesengebirge, with flax-spinning and other industries. Pop. 16,096.

Travancore (trav-an-kōr'), a native Indian state, subsidiary to the presidency of Madras, occupying the extreme southwest of the peninsula; area, 7091 square miles. It is for the most part hilly, and is bounded on the east by the Western Ghats, elsewhere chiefly by the sea, having Cape Comorin in the extreme south. The climate is healthy, and the soil fairly fertile. The principal products are iron, plumbago, timber, pepper, areca nuts, sugar, cocoa, coffee, tea, etc. Pop. 2,952,157.

Traveler's Tree (*Ravenala Madagascariensis* or *Urania speciosa*), an arborescent plant, native of Madagascar, having the appearance of a palm about 30 feet in height and forming the only species of the genus to which it belongs. Its trunk terminates in a bundle of leaves, each of which is borne by a petiole 6 or 8 feet in length and has a blade about 6 feet long. The seeds of this tree, ground into flour, are eaten by the natives, and the water contained in the cup-like sheaths of its leaf-stalks was formerly believed to be an aid to travelers.

Traveling Sidewalk, a platform or pathway moving in a continuous manner with a uniform rate of speed for the purpose of transportation. It was first suggested in 1870, but not put to practical use until 1893, at the Columbian Exposition, Chicago. One with three parallel platforms was a feature of the Paris Exposition, 1900. It was a belt or loop railway, with one or more intermediate steps between the first stationary and the third fast-moving platform, which was furnished with seats. Two speeds enabled a passenger to mount or alight easily on or from the rapid platform. In some cities this principle is taken advantage of in the large stores as a traveling stairway or escalator.

Traverse City (trav'ers), a city, county seat of Grand Traverse Co., Michigan, on the west arm of Grand Traverse Bay, 147 miles N. of Grand Rapids. It has a good harbor and is a summer resort. Here is the Traverse City State Hospital. The manufactures are fruit baskets, wooden dishes, furniture, etc., and it is a fruit and potato center. Pop. 12,115.

Travertine (trav'er-tēn), a white concretionary limestone, usually hard and semicrystalline, de-

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posited from the water of springs holding carbonate of lime in solution. Travertine is abundant in different parts of

Travertine with impressions of leaves.

Italy, and a large proportion of the edifices of ancient and modern Rome are built of this stone.

Travnik (träv'nēk), a town of Bosnia, on the Lasva. It has a garrison of Austrian troops. Pop. 6261.

Trawling (trą'ing), a mode of fishing in which a net in the form of a large bag, with a strong framework keeping the mouth properly distended, is dragged along the bottom of the sea. It is the mode chiefly adopted in deep-sea fishing, and in British waters has largely developed in recent years, being much prosecuted by small steam vessels specially built for the purpose, but it is not allowed within three miles of the shore. Cod, whiting, and other white fish are taken by it in large numbers, and some kinds of flat fish, as soles, can scarcely be taken in any other way. Trawling can be practiced only on a smooth bottom, as a rough bottom would destroy the net. See *Net*.

Traz-os-Montes (träsh-os-mōn'tāsh; 'Beyond the Mountains'), a northeast frontier province of Portugal; area, 4260 square miles. The province is fertile in parts, and the wine-growing district of Alto Douro is the native country of port. The chief towns are Villa Real and Braganza. Pop. 427,358.

Treacle (trē'kl). See *Sugar*.

Treacle-mustard, a name for the plant *Erysimum cheiranthoides*, also called *worm-seed*. See *Erysimum*.

Tread-mill, an instrument of punishment, of modern origin, consisting of a large wheel, about 20 or 25 feet wide, with steps on its external surface, upon which criminals are placed. Their weight sets the wheel in motion, and they maintain themselves in an upright posture by means of a horizontal bar fixed above them, of which they keep hold while moving their feet from step to step. The power thus obtained may be applied to the same purpose as water-power, steam, etc. The tread-mill has recently been abandoned in most penitentiaries. It was introduced into the prisons of Great Britain about 1820.

Treason (trē'zn), HIGH. Treason, the *crimen læsæ majestatis* of the Roman law, is that crime which is directly committed against the supreme authority of the state, and is considered to be the greatest crime that can be committed. Formerly in England certain offenses against private superiors were ranked as *petit* or *petty treason*, and it was in opposition to such offenses that treason against the sovereign was called high treason; eventually high treason was made the only treason. In a monarchy it is considered to be the betraying or the forfeiting of allegiance to the monarch; but in a republic it has reference to the government or the whole community. The concealment of treason is called misprision of treason. (See *Misprision*.) In the United States treason consists in levying war by a citizen against the country, or adhering to its enemies. The penalty is death.

Treason-felony, a term commonly used in Britain to designate such offenses as seeking or intending to deprive the sovereign of any of the royal powers or prerogatives, to levy war within the realm in order to forcibly compel a change in the royal measures, to intimidate either house of Parliament, or to excite an invasion in any part of the country. Treason-felony is punishable with penal servitude for life or for a term not less than seven years, or with imprisonment for a term not exceeding two years with or without hard labor.

Treasure Trove (trezh'ur trōv), coin, gold, silver-plate, or bullion found hidden in the earth or in any private place, the owner of which is not known. In Britain such treasure belongs to the crown; but if the owner is known, or is ascertained after the treasure is found, the owner and not the crown is entitled to it. It is, however, the practice of the crown to pay the finder the full value of the property on its being delivered up. On the other hand, should the finder conceal or appropriate it he is guilty of an indictable

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offense punishable by fine and imprisonment. In the United States such treasure, under the common law, belongs to the government, though the right is seldom, if ever, enforced. If the treasure is found on the surface, not hidden in the earth, the law is construed that the finder, not the government, is entitled to it.

Treasury (trezh'ur-i), the department of a government which has control over the management, collection, and expenditure of the public revenue. The Treasury department in the United States is in charge of the Secretary of the Treasury, appointed by the President and Senate, and a member of the President's Cabinet. It has sole charge of the national finances, under the laws of Congress, collects the revenue, pays all expenditures, audits all accounts, has charge of public buildings, national banks, coinage and paper money.

Treaty (trē'ti), an agreement, league, or contract between two or more nations or sovereigns formally signed by commissioners properly authorized, and ratified by the several sovereigns or the supreme power of each state. Treaties are of various kinds, as treaties for regulating commercial intercourse, treaties of alliance, offensive and defensive, treaties of peace, etc. In most monarchies the power of making and ratifying treaties is vested in the sovereign; in republics it is vested in the chief magistrate, senate, or executive council; in the United States of America it is vested in the President by and with the consent of the Senate. Treaties may be concluded and signed by diplomatic agents, but these, of course, must be furnished with full powers by the sovereign authority of their states. Among the most significant and important of recent treaties were two treaties of arbitration formed in 1911 between the United States on the one part and France and Great Britain on the other, providing for the peaceable settlement of almost any question that could arise between these nations, even those affecting so-called national honor. Similar treaties have since been made with other nations, until they now number 30 in all.

Trebbia (treb'bē-ȧ), a river of North Italy, which rises in the Apennines, and flows into the Po near Piacenza after a course of 55 miles. Here Hannibal defeated the Romans in 218 B.C., and in the vicinity the Austrians and Russians under Suvaroff defeated the French under Macdonald in 1799.

Trebizond (treb'i-zond; anciently *Trapezus*), a seaport in Asiatic Turkey, capital of a pashalic of the same name, on the Black Sea. It has an extensive trade, exporting silk, wool, tobacco, wax, oil, etc., from Asiatic Turkey; and silk fabrics, shawls, carpets, etc., from Persia. Pop. estimated at 40,000.

Treble (treb'l), in music, the highest vocal or instrumental part in a concerted piece, such as is sung by women or boys, or played by instruments of acute tone, as the violin, flute, oboe, clarinet, etc., or on the higher keys of the piano, organ, etc.: so called because it was originally a *third* part added to the ancient *canto fermo* and the counterpoint.

Tredegar (tred'ē-gär), a town of England, in the county of Monmouth, 12 miles west by south of Abergavenny, on the Sirhowy. Near it are valuable mines of coal and ironstone, with extensive blast-furnaces and steel works. Pop. 18,497.

Tree (trē), a perennial plant having a woody trunk of varying size, from which spring a number of branches, having a structure similar to the trunk. Trees are thus distinguished from shrubs, which have perennial stems but have no trunk properly so-called; and from herbs, whose stems live only a single year. It is difficult, however, to fix the exact limit between trees and shrubs. Trees are both *endogenous* and *exogenous*, by far the greater number both of individuals and of varieties belonging to the latter class. Those of which the whole foliage falls off periodically, leaving them bare in winter, are called *deciduous;* those of which the foliage falls only partially, a fresh crop of leaves being always supplied before the mature leaves are exhausted, are called *evergreen.* Trees are the longest lived organisms of the vegetable kingdom, and attain a great and indefinite age, far exceeding that of animals. See *Arboriculture, Botany, Timber,* etc.

Tree-crab, a crab of the genus *Birgus,* included among the land-crabs. It breaks open the shell of the cocoa-nut, etc., by repeated blows of its great claws, in order to feed upon the soft pulp of the nut. Tree-crabs can live for long periods out of water, but deposit their eggs in the sea.

Tree-ferns, the name given to several species of ferns which attain to the size of trees, as the *Alsophila vestita, Cibotium Billardieri,* etc. They are found in tropical countries. A handsome species, *Cyathea medullāris,* contains in its trunk a mucilaginous pulp comparable to sago, which is used ex-

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tensively for food in Polynesia and New Zealand.

Tree-frog, a name of frogs differing from proper frogs in the extremities of their toes, each of which is expanded into a rounded viscous pellet that enables the animals to adhere to the surface of bodies and to climb trees, where they remain during the summer feeding upon insects. *Hyla versicolor*, of the Northern and Middle United States, is very noisy towards evening.

Trefoil (trē'foil), a distinctive title applied to plants of various kinds on account of a peculiarity of the form of the leaf, which consists of three leaflets; examples, buckbean, clover, and medick. The same term is also applied to an ornamental foliation in Gothic architecture, used in the heads of window lights, tracery, paneling, etc.

Trematoda (trem-a-tō'da), a division of Scolecida, belonging to the group of Platyelmia or flat-worms, and represented by such forms as the flukes or Distomæ (see *Distoma*) and their allies. They are parasitic worms, usually of a flattened or rounded form, and are furnished with one or more suctorial pores, like minute cupping-glasses, for adhesion to the tissues of their hosts.

Tremolite (trem'u-līt), a mineral, a variety of hornblende. It is a silicate of calcium and magnesium, is white or colorless, and usually occurs in long, prismatic crystals.

Trench, Richard Chenevix, ecclesiastic and philologist, was born at Dublin, in 1807, and was graduated at Cambridge in 1829. He entered the church, and eventually became dean of Westminster (1856–63), and archbishop of Dublin, 1864. He was the author of a collection of poems, and a popular writer on philological and theological subjects. His works include *Notes on the Parables* (1841), *Notes on the Miracles* (1846), *On the Study of Words* (1851), *Proverbs and their Lessons* (1853), *Synonyms of the New Testament* (1854), *English Past and Present* (1855), *On Plutarch* (1874), *Lectures on Mediæval Church History* (1878), and many others. He died March 28, 1886.

Trenches, the name given in general to all those works which are used in attacking a fortress. See *Siege, Sap, Fortification.*

Trent, a river of England which rises in Staffordshire, 4 miles north of Burslem. It flows through the counties of Stafford, Derby, Nottingham, and Lincoln, and falls into the Humber after a course of 144 miles. It is navigable as far as Gainsborough, 25 miles, by vessels of 200 tons, and more than 100 miles by barges.

Trent (German, *Trient*, Latin, *Tridentum*), a town in the Tyrol, Austria, picturesquely situated on the left bank of the Etsch or Adige. It is fortified, and has a castle, formerly residence of the prince-bishops, a noble Romanesque cathedral dating from 1212, and other interesting buildings. Trent is a place of great antiquity, having been made a bishopric before 380. The only memorable event in its history is the council which was held in it, and bears its name (see below). Pop. 24,868.

Trent, Council of, a celebrated œcumenical council of the Roman Catholic Church, convened to settle various controversies that were agitating the church during the Reformation period, and for the reform of abuses. It met during the pontificate of Paul III at Trent in 1545, but the wars in Germany caused its transference to Bologna in 1546, when it dispersed. Pope Julius III again convoked it at Trent in 1551, but it dispersed a year later on the approach of the Lutherans. Eight years afterwards it was again called together by Pius IV, and it finished its labors in 1563. This council definitively settled the doctrines of the Roman Catholic Church.

Trent Affair. In October, 1861, Capt. Charles Wilkes, United States Navy, intercepted at sea the British mail steamer *Trent* bound from Havana to St. Thomas, and took off two Confederate commissioners, accredited to France, Messrs. Mason and Slidell, who were among her passengers. They were taken to Boston, and imprisoned at Fort Warren, but were released on Jan. 1, 1862, on the demand of the British government, and permitted to proceed to Europe. The affair created intense excitement at the time, but Secretary Seward accepted England's demand as an adoption of the American doctrine which denied the right to search, and on that basis gave up the captives. The demand, however, gave rise to much irritation.

Trenton (tren'tun), a city, capital of Grundy Co., Missouri, is on a branch of the Grand River, 102 miles N. E. of Leavenworth, Kansas. It is the seat of Ruskin College and has railroad shops and flour mills. Pop. 5656.

Trenton, a city, the capital of New Jersey, on the Delaware at the head of tide-water and steamboat navigation, 29 miles N. E. of Philadelphia.

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It is laid out with great regularity, and has a state-house, court-house, state-prison, state hospital for insane, armory, reform home for girls, normal and model schools, and a Roman Catholic college. The manufactures are large and numerous, including extensive pottery works, wire-cable and other iron works, steam turbines, and various others. Pop. 108,000. The battle of Trenton, perhaps more than any other, decided the success of the Revolution, by giving new courage and confidence to the people. On the morning of December 25, 1776, Washington, with about 2500 men, crossed the Delaware River from the Pennsylvania side, eight miles above Trenton. After a forced march, he surprised Col. Rall, the Hessian general, and captured his entire force.

Trepang (tre-pang'), the sea-slug, a marine animal of the genus *Holothuria*, belonging to the class Echinodermata, order Holothuridæ, popularly known as 'sea-cucumbers,' or bêches-de-mer.

Trepang (*Holothuria edulis*).

Trepanning (tre-pan'ing), the operation of cutting a circular opening into the skull by means of a surgical instrument called a *trepan* or *trephine*. This consists of a handle, to which is fixed a small hollow steel cylinder, of about ½ to 1 inch in diameter, having teeth cut on its lower edge so as to form a circular saw. Trepanning is especially resorted to for the purpose of relieving the brain from pressure, as in fracture of the skull or in cerebral abscess.

Trespass (tres'pas), in law, a term which is applied generally to any offense against the person or property of another, but is more especially applied to a peaceable but unlawful entry upon the property of another, the remedy for which is by action of damages. Any injuries committed against land or buildings are in the most ordinary sense of the word trespasses, as entering another's house without permission, walking over the ground of another, or suffering any cattle to stray upon it, or any act or practice which damages the property, or interferes with the owner's or occupier's rights of possession. A creditor or customer can be ordered away by a householder or shopkeeper, and even the civil courts have no power to give a right of entry to officers intrusted with the execution of legal processes, though such officers may maintain possession if once they gain entrance. Malicious trespass is a willful, malicious, or mischievous injury of private or public property, real or personal.

Trevelyan (tre-vel'yan), Sir George Otto, nephew of Lord Macaulay, born in 1838. He was educated at Harrow, was graduated at Trinity College, Cambridge, and entered the Indian civil service by competition. He was elected to parliament in 1865, and with the exception of a short interval always followed Gladstone's lead, holding several cabinet positions. He is the author of the *Life and Letters of Lord Macaulay*, *Early History of Charles James Fox*, *History of the American Revolution*, etc.

Treves (trēvz; German *Trier*, Lat. *Augusta Trevirorum*), a town in the province of Rheinland, Prussia, on the right bank of the Moselle. It is considered the oldest city in Germany, and contains many Roman remains. It is surrounded by walls, and is indifferently built. The chief buildings are the cathedral, built at various times from the sixth century downwards, and containing the Holy Coat (see *Holy Coat of Treves*); the Liebfrauenkirche, or Church of our Lady, an elegant Gothic structure; and the old archiepiscopal palace, now used as a barracks. The Roman remains include an amphitheater, the Porta Nigra (Black Gate), baths, etc. Treves became a Roman colony under Augustus, and subsequently it was the residence of several emperors. It rose to great splendor under the archbishop-electors, who exercised great political influence in Germany. From 1473 to 1797 it had a university. Pop. 43,324.

Treviso (trā-vē'zō), a town of Italy, capital of the province of Treviso, 15 miles N. N. W. of Venice, on the Sile. It is a walled town with spacious streets and large squares, and has a great number of handsome buildings. The manufactures consist chiefly of silk and cotton goods, machinery, and cutlery. Pop. 16,933.

Trevithick (trav'i-thik), Richard, engineer and inventor, born in Cornwall in 1771; died in 1833. In 1797 he succeeded his father as a leading engineer in Cornish mining. Among his first inventions was an improved pump, which soon came into universal use in deep mining. He next perfected a high-pressure steam-engine, and began to experiment in the construction of locomotive engines. Passengers were first conveyed by steam by

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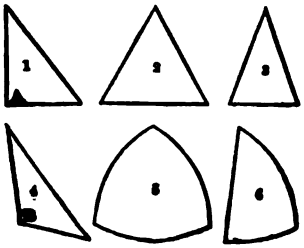
means of his road locomotive in 1801, and he soon after successfully worked a tramroad locomotive. His ideas were afterwards taken up and developed by Stephenson. He was the first to recognize the value of iron in shipbuilding, and the application of steam to agriculture. His request for recognition and reward for his numerous inventions was disregarded by the government, and he died in poverty.

Triad (trī'ad), a trinity, a unity of three. In Welsh literature, the name is given to a class of ancient compositions — moral and historical — comprising enumerations of particulars bound together in knots of three. The *Hindu Triad*, *Trimurti*, or trinity, consists of the three deities *Brahma*, *Vishnu*, and *Siva*, considered as an inseparable unity.

Trial. See *Jury* and *Procedure, Civil.*

Triangle (trī'ang-gl), in geometry, a figure bounded by three lines and containing three angles. The three angles of a plane triangle are equal to two right angles or 180°, and its area is equal to half that of a rectangle or parallelogram of the same base and altitude. The triangle is the most important figure in geometry, and may be considered the element of all other figures. If the three lines or sides of a triangle are all straight, it is a *plane* or *rectilinear triangle*, as in figs. 1, 2, 3, 4. If all the three sides are equal, it is an *equilateral triangle*, as in fig. 2. If two of the sides only are equal, it is an *isosceles triangle*, fig. 3. If all the



Triangles.

three sides are unequal, it is a *scalene triangle*, fig. 4. If one of the angles is a right angle, the triangle is *right-angled*, as fig. 1, having the right angle at A. If one of the angles is obtuse, the triangle is called *obtuse-angled*, as fig. 4, having the obtuse angle B. If all the angles are acute, the triangle is *acute-angled*, as figs. 2, 3. If the three lines of a triangle are all curves, the triangle is said to be *curvilinear*, as fig. 5. If one or two of the sides are straight and others or other curve, the triangle is said to be *mixtilinear*, fig. 6. If the sides are all arcs of great circles of the sphere, or arcs of the same circle, the triangle is said to be *spherical.*

Triangulation, a method used in surveying. See *Trigonometrical Survey.*

Trias, Triassic System. See *Geology.*

Tribune (trib'ūn; *tribūnus*), in Roman antiquity, originally an officer connected with a tribe, or who represented a tribe for certain purposes; especially, an officer or magistrate chosen by the people to protect them from the oppression of the patricians or nobles, and to defend their liberties against any attempts that might be made upon them by the senate and consuls. These magistrates were at first two, but their number was increased to five and ultimately to ten. This last number appears to have remained unaltered down to the end of the empire. There were also military tribunes, officers of the army, each of whom commanded a division or legion, and also other officers called tribunes; as, *tribunes* of the treasury, of the horse, etc. See *Rome* (*History*).

Trichina (tri-kī'na), a minute nematoid worm, the larva of which was discovered in 1835 in the tissue of the voluntary muscles of man, giving rise to a disease since known as *trichiniasis* or *trichinosis*. The worm is common also to several other mammals, especially to the pig, and it is generally from it that man receives the disease. When a portion of flesh, say of the pig, containing larvæ is taken into the stomach the larvæ in a few days become developed into procreative adult worms, having in the meantime passed into the intestines. The male worm is about $^1/_{20}$th of an inch long, the female about a half more. The female produces embryos in extraordinary numbers, which gain entrance into the muscles by penetrating the mucous coat of the intestine and entering the capillaries, whence they are carried to their habitat by the circulation. There they disorganise the surrounding tissue, setting up at the same time morbid action in the system, manifested by swelling of the face, body, and limbs, fever, pains, etc., and resulting sometimes in death. In the muscles they become quiescent, are encased in a cyst covered with calcareous matter, and may give no more trouble. Thorough

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BOMBS FROM A FRENCH AEROPLANE FALLING ON TRIESTE

In the upper center of this remarkable photograph can be seen three aerial torpedoes just released by the aeroplane from which the photograph was taken. Far below is the great Austrian Naval Base with its wharves and docks and the great railway station upon which the bombs are falling.

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cooking kills the trichinæ, and thus prevents infection.

Trichiniasis, TRICHINOSIS (trik-i-nī'a-sis, trik-i-nō'sis), a painful and sometimes fatal disease produced in man by eating meat, especially the flesh of pigs, either raw or insufficiently cooked, infested with *trichinæ*. See *Trichina*.

Trichinopoly (trich-in-op'ō-li), a town of British India, capital of district of same name, in the presidency of Madras, on the right bank of the Cavery. It is a military station, and contains a citadel on a granite peak 500 feet high, which commands the surrounding country. The native town lies at the foot of the rock, and beyond it are the European quarters, barracks, hospitals, St. John's Church, with the tomb of Bishop Heber, a Roman Catholic chapel, etc. Pop. 122,028.

Triclinium (trī-klin'i-um), among the Romans the dining-room where guests were received, furnished with three couches, which occupied three sides of the dinner table, the fourth side being left open for the free ingress and egress of servants. On these couches, which also received the name of tricilinium, the guests reclined at dinner or supper. Each couch usually accommodated three persons.

Tricolor (trī'kul-ur), the French national flag, or one formed after the model of it. The French tricolor is blue, white, and red in equal vertical sections, the blue being next the flag-staff.

Tricoupis, Trikupis (trī-kō'pis), CHARILAOS, a Greek statesman, born at Nauplia in 1832; died in 1896. He became minister of foreign affairs in 1866, and premier in 1875 and on several later occasions, and was active in efforts for the development of Greece. Failing in his efforts to relieve the country from its financial difficulties, he was crushingly defeated in the election of 1895.

Tricycle (trī'si-kl), a three-wheeled variety of velocipede, introduced about 1878, and therefore subsequently to the bicycle. The earliest patterns were rear-steering, but were soon superseded by front-steering machines, the latter being steadier. Tricycles were first worked by pedaled levers, but this form soon gave way to the rotary action, which is produced by a cranked axle to which the pedals are fixed. This axle is connected by chains running on toothed wheels with the driving axle. The positions and sizes of the wheels, and the steering gear, vary nearly in every make.

Tridacna. See *Clam*.

Tridentine Council, the Council of Trent. See *Trent* and *Trent, Council of*.

Triest (trē-est'; Italian, *Trieste*), a seaport town in Austria, 214 miles southwest of Vienna, on a gulf of same name, at the northeastern extremity of the Adriatic. The old town, on an acclivity crowned by a castle, has steep and narrow streets, but in the new town the streets are spacious and well paved, and there are handsome thoroughfares and squares. The chief buildings are an ancient cathedral in the Byzantine style, and the exchange block of buildings, which is a handsome edifice. Triest is the chief Austrian port, and the most important trading place in the Adriatic, and has now very extensive harbor accommodation. Triest is the headquarters of the Austro-Hungarian Lloyd's shipping company, who have extensive shipbuilding and other establishments here. Triest existed under the Roman empire (Latin name *Tergeste* or *Tergestum*), but did not rise to importance until recent times. Pop. 221,-993.

Trifolium (trē-fō'li-um), the Trefoil or Clover, a genus of low herbs, with the leaves, as a rule, digitately trifoliate and with red, purple, white, or yellow flowers, rarely solitary. There are about 150 species, chiefly found in the northern hemisphere, abounding in Europe and many of them natives of the United States. Several of the species are very useful in agriculture, both as pasture plants and from their power of enriching the soil. This arises from their roots being infected by certain nitrogen-fixing germs, through the action of which the clovers add to the nitrogenous contents of the soil. The true clovers have herbaceous, not twining stems, roundish heads or oblong spikes of small flowers, the corolla remaining in a withered state until the ripening of the seed. The most important to the farmer is the common Red Clover (*T. pratense*), a native of Europe, but naturalized in all parts of the United States, widely cultivated and growing freely in meadows and pastures. The White or Dutch Clover, Creeping Trefoil, or Shamrock (*T. repens*) is found in most parts of North America and Europe, nearly always springing up where a barren heath is turned with the spade or plough. It is a valuable feeding plant in dry and thin soils, and its spontaneous growth in a meadow is hailed as a sign of improving conditions. In laying down permanent pastures, except in strong land, it should be somewhat

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stock raising region. Has railway shops, foundry and machine shops and other industries. Pop. 10,204.

Trinidad, one of the British West India Islands, and, excepting Jamaica, the largest and most valuable. It is the most southerly of the Windward group, lies immediately off the northeast coast of Venezuela, and is about 55 miles long by 40 miles broad; area, 1755 square miles. There is a lake of mineral pitch, 104 acres in extent, containing an almost inexhaustible supply. The chief products are sugar, cocoa, molasses, rum, cocoanuts, pitch, timber and fruits. The climate is healthy, and, though hot, is well suited to Europeans. Trinidad is a crown colony, the public affairs being administered by a lieutenant-governor, assisted by an executive and a legislative committee. It was discovered by Columbus in July, 1491, and taken from Spain by the British in 1797. The capital, Port of Spain, on the northwest side of the island, is one of the finest towns in the West Indies. Pop. (1912) 340,000.

Trinidad, a town near the southern coast of Cuba, in Santa Clara province. It is one of the seven original cities established by Diego Velasquez; founded in 1514. Pop. 12,000.

Trinitrotoluene (trin-i'tro-to'lu-ēn), a yellow, crystalline substance, insoluble in water, but soluble in alcohol, ether and benzine. It has recently been adopted as the base of shell-fillers instead of prussic or ammonium nitrate compounds. It is not dangerous to handle, burns without exploding, and has no bad effects physiologically.

Trinity (trin'i-ti), a theological name given to the Deity as expressive of the Christian doctrine of the Triune nature of God, the union of the Father, the Son, and the Holy Spirit as Three Persons, and One God. The doctrine of the Trinity is nowhere expressly taught in the Old Testament, but in the New Testament it is clearly taught, though the word Trinity does not occur. A comprehensive statement of the doctrine of the Trinity is found in the Athanasian Creed, which asserts that 'the Catholic faith is this: That we worship one God as Trinity, and Trinity in Unity —neither confounding the persons nor dividing the substances—for there is one person of the Father, another of the Son, and another of the Holy Ghost. But the Godhead of the Father and of the Son, and of the Holy Ghost is all one; the glory Equal; the majesty co-eternal.' Difference in interpretation of the doctrine of the Trinity led to the division of the Church into the Eastern and Western.

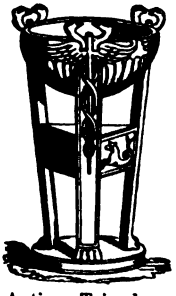
Trio (trē'ō, trī'ō), a musical composition for three voices or for three instruments. Also a record or subordinate division of certain musical compositions.

Triple Alliance. Several treaties in European politics are known by this name. The first was formed in 1668 by Great Britain, Sweden, and the Netherlands against Louis XIV; the second in 1717 by Great Britain, France, and Holland against Spain. In 1882 was formed that of Austria, Germany and Italy. From this Italy withdrew during the European war.

Triple Entente (oṇ-tent'), an alliance between Great Britain, France and Russia. Great Britain remained for long outside of alliances, but at the opening of the twentieth century, owing chiefly to the efforts of Edward VII, began to enter into formal *ententes*, first with France and then with Russia. The Triple Entente—or Understanding—arose from a Dual Alliance between Russia formed in 1887, an informal understanding between Britain and France in 1904, and a similar understanding between Britain and Russia in 1907.

Triplet (trip'let), in music, a combination of three notes to be played in the time of two. They are joined by a slur and distinguished by having the figure 3 above them.

Tripod (trī'pod), anciently a bronze altar consisting of a caldron raised on a three-legged stand of bronze. Such was the altar of Apollo at Delphi. Tripods of fine workmanship in precious metals were placed in Apollo's temple.



Antique Tripod.

Tripoli (trip'o-li), a country in the north of Africa, largely desert; is bounded on the north by the Mediterranean, west by Tunis, south by Fezzan and the Libyan Desert, and east by the Libyan Desert and Barca; area, about 410,000 square miles. Its boundaries are somewhat uncertain, but it extends inland for about 800 miles. The coast-line, which is 700 or 800 miles in length, including the Gulf of Sidra, or Greater Syrtis, has only one harbor, that of the capital, Tripoli. The eastern part of the interior is mostly barren sand, but in the south and west it is diversified by mountain ranges, attaining a height of about 4000 feet. The richest tract of

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Tripoli is that which stretches about 15 miles along the coast, and includes the capital. It is productive of wheat, barley, millet, and Indian-corn; oranges, pomegranates, lemons, figs, apricots, plums, and other fruits. Abundant rains fall from November to March, while from May to September the heat is intense, the sirocco often blows, and the thermometer rises at times to a high figure. The population, which in the outlying districts consists of Berbers and Bedouins, and in the town chiefly Moors, is estimated at about 1,000,000.— TRIPOLI, the capital, stands on a tongue of land projecting into the sea, has a moderately good harbor, and consists of a great number of narrow and uneven lanes, the chief buildings being the governor's castle, the great mosque, a handsome structure, synagogues, bazaars, public baths, etc. The trade across the desert extends as far as Timbuctoo and Bornou. The chief manufactures are carpets, long celebrated, other woolen goods, and leather. Tripoli, originally held by the Phœnicians, became in time part of the Roman province of Africa, and in the 8th century was conquered by the Arabs. It was taken by Spain in 1510, and assigned to the Knights of St. John, who had been driven from Rhodes by the Turks. The Knights surrendered to the Turks in 1551 and it remained a province of Turkey until 1714, when its bey became largely independent. Turkey subdued it again in 1835, and it remained a vilayet of the Ottoman empire until 1911, when Italy, which had long sought to extend its interests in Africa, invaded it and after a war continuing until October, 1912, obtained possession. At present the possession is limited in great measure to the narrow strip of coast held by the Italian army of occupation. Pop. of the capital about 30,000.

Tripoli, TARABOLUS, or TRIPOLIS, a seaport of Syria, capital of a pashalic of the same name, situated on the Mediterranean, 48 miles northeast of Beyrout. There is a trade in silk, wool, cotton, tobacco, galls, etc. Pop. about 30,000.

Tripoli, a mineral originally brought from Tripoli and used in polishing metals, marbles, glass, etc. It is a kind of siliceous rottenstone, of a yellowish-gray or white color, rough to the touch, hard in grain but not compact, and readily imbibes water. It is also found in France, Italy and Germany.

Tripolitza (trip-u-lit'za), a town of Southern Greece, province of Arcadia. Previous to the revolution it was the capital of Morea, but Ibrahim Pasha took possession of it in 1828 and razed it to the ground. It has been partially rebuilt. Pop. 10,465.

Tripos. See *Cambridge, University of.*

Triptych (trip'tik), a picture, carving, or other representation in three compartments side by side; most frequently such as is used for an altar-piece. The central picture is

Triptych.— Painting by Allegretto Nucci, 1465.

usually complete in itself. The subsidiary designs on either side are smaller, and frequently correspond in size and shape to one-half of the principal picture.

Trireme (trī'rēm), a galley or vessel with three benches or ranks of oars on each side, a common class of war-ship among the ancient Greeks, Romans, Carthaginians, etc. The trireme was also provided with a large square sail, which could be raised during a fair wind to relieve the rowers, but was never employed in action.

Trismegistus. See *Hermes Trismegistus.*

Trismus (triz'mus), a species of tetanus affecting the under jaw with spastic rigidity; locked-jaw. There are two kinds of trismus, one attacking infants during the two first weeks from their birth, and the other attacking persons of all ages, and arising from colds or a wound. See *Tetanus.*

Tristan D'Acunha (dâ-kun'yâ), the largest of three islands in the South Atlantic (the others being Nightingale and Inaccessible Island), about 1300 miles s. w. of St. Helena. It is mountainous, and one peak rises to the height of 7640 feet. The island was taken possession of by Great Britain in 1817. Pop. less than 100.

Triticum (trit'i-kum), the genus of grasses including wheat.

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Triton. See *Newt.*

Tritonidæ (trī-ton'i-dē), a family of marine nudibranchiate, gasteropodous molluscs, many of which are found on the coast of England, France, and other European countries.

Tritons (trī'tonz), in Greek mythology, the name of certain sea-gods. They are variously described, but their body is always a compound of the human figure above with that of a fish below. They carry a trumpet composed of a shell, which they blow at the command of Poseidon to soothe the waves.

Triumph (trī'umf), in Roman antiquity, a magnificent procession in honor of a victorious general, and the highest military honor which he could obtain. It was granted by the senate only to one who had held the office of dictator, of consul, or of prætor, and after a decisive victory or the complete subjugation of a province. In a Roman triumph the general to whom this honor was awarded entered the city of Rome in a chariot drawn by four horses, crowned with laurel, and having a scepter in one hand and a branch of laurel in the other. He was preceded by the senate and the magistrates, musicians, the spoils, the captives in fetters, etc., and followed by his army on foot, in marching order. The procession advanced in this order along the *Via Sacra* to the Capitol, where a bull was sacrificed to Jupiter, and the laurel wreath deposited in the lap of the god. Banquets and other entertainments concluded the solemnity. A naval triumph differed in no respect from an ordinary triumph, except that it was upon a smaller scale, and was characterized by the beaks of ships and other nautical trophies.

Triumphal Arch. See *Arch.*

Triumvir (trī-um'vir), one of three men united in office. The triumvirs (*L. triumviri*) of Rome were either ordinary magistrates or officials, or else extraordinary commissioners who were frequently appointed to execute jointly any public office. But the men best known in Roman history as triumvirs were rather usurpers of power than properly constituted authorities. The term *triumvirate* is particularly applied in Roman history to two famous coalitions, the first in 59 B. C. between Cæsar, Pompey, and Crassus; the second in 43 B. C. between Antony, Octavian, and Lepidus. See *Rome* (*History*).

Trivandrum (trē-vän'drŏm), a town of India, the capital of Travancore state, Madras presidency, situated about two miles from the sea. The town is of considerable importance, has a fort containing the rajah's palace and other buildings, an ancient temple, college with European instructors, medical school, hospitals, Napier museum, various handsome buildings, and a military cantonment. Pop. 57,882.

Trivium (triv'i-um), the name given in the middle ages to the first three of the seven liberal arts — grammar, rhetoric, and logic. The other four, consisting of arithmetic, music, geometry, and astronomy, were called the *quadrivium.* See *Arts.*

Troad. See *Troy.*

Trocha (trō'ka), derived from the Greek and meaning a circle. As known in Cuba, during the insurrection of 1895-98, it was a barrier, extending across the island, built of posts, at times three and even five deep, to which barbed wire was strung. Behind this stockade the Spanish soldiers fought. United States officers speak of its dire effectiveness.

Trochee (trō'kē), in prosody, a foot of two syllables, the first long and the second short, as Lat. *fāma*, or Eng. *nation.*

Trochilidæ. See *Humming-bird.*

Trochu (tro-shü), Louis Jules, a French general, born in Brittany in 1815; educated at St. Cyr; engaged in the Algerian, Crimean, and Italian campaigns; published a pamphlet entitled *L'Armée Française en 1867*, and showed the weakness of the French army, by which he forfeited the favor of Napoleon. At the outbreak of the Franco-German war (1870), however, he was made governor of Paris, and when the republic was proclaimed he was intrusted with the defense of the city, a position which he held until the capitulation. He wrote *Pour la Vérité et pour la Justice*, and *L'Armée Française en 1879.* He died in 1896.

Troglodyte (trog'lu-dīt), a cave-dweller; one dwelling in a cave or underground habitation. The ancient Greeks gave the name troglodyte to various races of savages inhabiting caves, especially to the cave-dwellers on the coast of the Red Sea and along the banks of the Upper Nile in Nubia and Abyssinia, the whole of this district being known by the name Troglodytikē. It is shown by archæological investigations that cave-dwellers in all localities probably preceded house-builders.

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Troglodytes (-tēz), the generic name of the wrens; also that of the gorilla and chimpanzee.

Trogon (trō'gon), a genus of birds, the type of the family Trogonidæ. The trogons inhabit the forests of the intertropical regions.

Trois Rivieres (trwä-ri-vyâr; 'three rivers'), an old city of Quebec, Canada, situated at the junction of the St. Lawrence and St. Maurice rivers. It has various thriving industries. Pop. (1913) 18,000.

Trolley (trol'li; electric railway). A truck which travels along overhead wires conveying an electric current, and forms a means of connection between them and a railway car. Cars moved by this system have come very widely into use and are commonly known as trolley cars. See *Electric Railway*.

Trollope (trol'op), ANTHONY, an English novelist, a younger son of Frances M. Trollope, was born in London in 1815; died in 1882. In 1841 he was appointed clerk to a post-office surveyor in Ireland, where his experiences gave him material for his first novels, *The Macdermots of Ballycloran* (1847), and *The Kellys and the O'Kellys* (1848), neither of which was successful. Meanwhile he was appointed inspector of rural post-offices in Ireland and parts of England, and continuing his novel-writing his first success was *The Warden* (1855), followed by *Barchester Towers* (1857), *Dr. Thorne* (1858), and numerous others. He also published accounts of his travels, including *The West Indies and the Spanish Main* (1859), *Australia and New Zealand* (1873), *South Africa* (1878), besides a *Life of Cicero* (1881), etc.— THOMAS ADOLPHUS TROLLOPE, eldest brother of the above, was born in 1810; resided chiefly in Florence; and was the author of *Impressions of a Wanderer in Italy* (1852), *Tuscany in 1849-59* (1859), *History of Florence* (1865), etc. He died in 1892.— FRANCES MILTON TROLLOPE, mother of the above, was born about 1790, and died in 1863. She was the author of *Domestic Manners of the Americans* (1831), *The Refugee in America* (1832), books which were very severe upon American life and customs.

Trolls (trōls), in Northern mythology, a name of certain supernatural beings, in old Icelandic literature represented as a kind of giants, but in modern Scandinavia regarded as of diminutive size, and represented as a kind of mischievous imps or goblins.

Trombone (trom'bōn), a deep-toned brass instrument of the trumpet kind, consisting of three tubes; the first, to which the mouthpiece is attached, and the third, which terminates in a bell-shaped orifice, are placed side by side; the middle tube is doubled, and slides into the other two like the tube of a telescope. By the manipulation of the slide the tube of air is altered in

1, Valve Trombone. 2, Slide Trombone.

length, and the pitch accordingly varied. The trombone is of three kinds, the alto, the tenor, and the bass; and some instruments are fitted with pistons, when they are known as valve trombones.

Tromp, MARTIN HARPERTZOON, the son of a Dutch naval officer, was born at Briel in 1597. He went to sea with his father in 1607; received the appointment of lieutenant-admiral; gained a decisive victory over the Spanish and Portuguese fleet near Dunkirk in 1639; encountered Blake and Monk in 1653, and in the same year he again encountered Monk and was killed in the battle.— His son, CORNELIUS, born at Rotterdam in 1629, was also distinguished in the naval service of his country. He died in 1691.

Tromsö (trom'seu), a seaport of Norway, capital of the province of Tromsö, situated on a small island of the same name off the west coast. It has an extensive trade in fish, train-oil, etc. Pop. 6955.

Trondhjem (trond'hyem), a seaport on the west coast of Norway, the ancient capital of the country, situated on a bay at the mouth of the Nid, on the south side of the Trondhjem-fiord. It possesses strong fortifications on the mainland and on the small rocky island of Munkholm. The chief buildings are the cathedral, which in some parts is as old as 1033; the Kongsgaard, or palace of the old Norwegian kings; and a museum, including a picture-gallery, and a library with some rare MSS. The trade consists chiefly in exports of timber, dried and salted fish, tar, and copper. Pop. (1910) 45,335.

Troop (trōp), a body of cavalry, usually consisting of sixty troopers, under the command of a captain and two lieutenants.

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from the blowing of trumpets in the temple with more than usual solemnity.

Trumpet-shell. See *Conch.*

Trumpet-weed, a large South African sea-weed, *Ecklonia buccinalis,* the stem of which being hollow is used as a siphon, and also as a trumpet.

Trumpet-wood. See *Cecropia.*

Trunk-fish. See *Ostracion.*

Trunk-hose, a kind of short wide breeches gathered in above the knees, or immediately under them, and distinguished according to their

Trunk-hose.
1, Charles IX of France, 1550–1574.
2, Robert Carr, Earl of Somerset, died 1645.

peculiar cut as French, Gallic, or Venetian. This garment prevailed during the time of Henry VIII, Elizabeth, and James I.

Truro (tru'rō), an episcopal city, seaport, and municipal borough of England, county of Cornwall, at the confluence of the Kenwyn and St. Allen, 8½ miles N. of Falmouth. The principal edifice is the new cathedral (the first Protestant cathedral, except St. Paul's, built in England), consecrated in 1887, when Truro was established as a bishopric. The smelting of tin is carried on to a great extent. Pop. 11,325.

Truro, Nova Scotia, on the Intercolonial Railway. It has manufactures of foundry materials, lasts and pegs, hats and caps, knit goods, etc. Pop. 6107. (See *Truro.*)

Truss, in surgery, a bandage or apparatus used in cases of hernia to keep up the reduced parts and hinder further protrusion, and for other purposes.— In building, a combination of timbers, or of iron-work, or of both together, so arranged as to constitute an unyielding frame. The simplest example of a truss is the principal or main couple of a roof, in which the tie-beam is suspended in the middle by the king-post to the apex of the angle formed by the meeting of the rafters. See *Roof.*

Trust. In law, a trust is a peculiar species of ownership, in which property, real or personal, is invested in one or more persons for the benefit of others. The person who holds the property is a *trustee;* the person for whose benefit it is held is called *cestui que trust* (he that has the benefit of the trust). Trusts, as originally employed in England, applied to real estate only, but in recent times have been extended to personal property, and before the middle of the nineteenth century the latter form developed into what are known as commercial trusts, great trade combinations ostensibly intended to cheapen expenses, regulate production, and remove competition, but practically going beyond those ostensible purposes. Trusts of this kind quickly made their way to the United States, where they have developed more rapidly and greatly than in England, some of them having become immense in the amount of capital involved, so much as to be regarded by the community at large with hostility as threatening the foundations of honorable industry. As so regarded, the term trust is applied to cases foreign to its original application, being employed to designate trade combinations in general, irrespective of their form and mode of creation. As such the term corporation is also commonly applied. The combinations now in existence have ceased to be normal trusts from the fact that the trustees have come to control, not the real and personal property of the corporations involved, but the shares of their stockholders. This gives the trustees the power of managing, though not the legal ownership of, the property concerned. Against these great combinations of financial and commercial property a vigorous enmity has arisen, and the governing powers have proceeded against them in various instances as law-breakers and foes of the community. Thus suits were brought against the Sugar Trust in New York, the Standard Oil Company in Ohio, and the Chicago Gas Company in Illinois, and the illegality of these combinations was proved. The forfeiture of one charter in each case, with the liability to a similar forfeiture in the case of the other

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corporations concerned, operated effectually to dissolve these trusts in their earlier forms. This preliminary battle against the trusts simply changed, without destroying them. They were quickly reorganized in new and different forms and continued in operation. They disappeared as corporate trusts, but continued to exist as combinations held together by contract. And their old methods of injurious procedure were continued: the stifling of competition of minor concerns, the procuring of special rates and privileges in railroad transportation, the issue of watered stock, increasing the sum of floating capital far beyond the value of the property; all these tending to keep alive the enmity of the community at large. There have been many new suits at law brought against the trusts, and legislative investigations by the House of Representatives, the New York Senate, and the Canadian Parliament. Anti-trust laws have been passed in a number of the states, and in 1890 Congress passed a National Anti-trust Act. It cannot be said that these had much beneficial effect. Most important of all has been the creation of the Interstate Commerce Commission, for the purpose of dealing with all illegal practices of the trusts. Unfortunately this Commission was long hampered by lack of full powers of action, a weakness only recently removed by new legislation. Of late years it has proceeded actively against the trusts and won some notable victories. A spectacular one of these was the decision given by a Federal court in 1907, fining the Standard Oil Company the immense sum of $29,240,000 for accepting illegal rebates in railroad freights. This decision was afterwards reversed by a United States Circuit Court of Appeals, but it went far to do away with the evil of rebating, which is now strictly forbidden by law. Another notable suit was against the Sugar Trust, in the operation of which fraudulent methods of weighing imported sugar had been discovered. In a decision rendered March 5, 1909, the trust was fined $134,116 for these practices, and in 1910 it was compelled to disgorge over $2,000,000 for fraudulent weighing. The two most important suits were those brought against the Standard Oil and the American Tobacco corporations in 1911. These were both decided adversely to the trusts, which were found guilty of stifling competition and ordered to dissolve. Steps have been taken by the companies to obey the orders of the court, but how effective their breaking up into their elements will prove remains to be seen. Various devices have been proposed for the more effective control of trusts by the Federal Government, and a Corporation Tax has been imposed since 1909. The Clayton Anti-Trust Bill, passed by Congress in 1914 supplements the Sherman Law and makes it more rigid; and the Trade Commission Bill, likewise passed in 1914, provides for a commission with full inquisitional powers into the operation and organization of corporations and authority to condemn unfair methods of competition.

Trustee (trus-tē'), in law, a person to whom property is legally committed in trust for the benefit of some other party or parties, or for some special purpose. See *Trust*. No one is compelled to undertake a trust, but if he once accept he cannot renounce it unless the trust-deed contains a provision enabling him to do so, or a competent court grants him a discharge, or by the consent of all those beneficially interested in the estate. Trustees are liable for the consequences of any breach of trust however innocent, and the estate of a trustee deceased, who has misapplied the trust fund, is liable for the deficiency; but generally speaking, the law only requires of a trustee the same amount of care and prudence he would be expected to display in managing his own affairs. Where there are several trustees each is liable for his own acts and receipts only, unless there is common agreement. Trusts are generally to protect the interests of married women and children, by placing in the hands of trustees for them the legal rights which they would be incapable of exercising. Frequently trusts involve the sale or purchase of lands, or investment of funds, in which cases the trustee has to exercise due caution, as he may be rendered liable for any loss.

Truxillo, or TRUJILLO (both tru-hēl'-yō), (1) a town of Western Spain, prov. of Caceres, the birthplace of Pizarro. Pop. 12,512. (2) A town (also called *Chimú*) in the north of Peru, near the coast, and having as its port Salaverry. It was founded by Pizarro, has a university, and a good trade. Pop. about 8000. (3) The capital of the state of Truxillo, Venezuela, 90 miles s. w. of Barquisimeto. Extensive coal deposits exist in the vicinity. Pop. 10,000.

Truxton (truks'tun), THOMAS, naval officer, born on Long Island in 1755; died in 1822. He commanded a privateer and took valuable prizes in the Revolution. In 1794 he was made captain in the navy and in the naval

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war with France (1799–1800) captured the French frigates *L' Insurgente* and *La Vengeance*. The latter victory brought him a gold medal from Congress.

Trygonidæ (trī-gon'i-dē), the family name of the stingrays (which see).

Tsaritsyn, a Russian city in Saratov province, on the Volga. Pop. (1910) 100,847.

Tsarskoye-selo (tsär'skō-yĕ sye-lō), ZARSKOJE-SELO ('Czar's Town'), a town of Russia, in the province of St. Petersburg, containing the summer residence of the imperial family. Pop. 22,353.

Tschaikovsky (chī-kof'ski), PETER ILITCH, a noted Russian composer, born in 1840; died in 1893. In 1862, when the Conservatory of Music was founded at St. Petersburg, he gave up an official position to devote himself to music, studying under Anton Rubinstein and Zaremba. From 1866 to 1878 he taught in the conservatory; then retired to devote himself to composition. He is best known by his symphonies.

Tsetse-fly (tset'se), a South African dipterous (two-winged) insect (*Glossina morsitans*), akin to the gad-fly, whose bite is often fatal to horses, dogs, and cows, but was long considered innoxious to man and wild beasts. It has been discovered that the same insect carries the germs of the deadly sleeping sickness, which has long been known in parts of Africa and of late years has proved especially fatal to the natives of Uganda. Active efforts are now being made to check the ravages of this disease by preventive methods, the habits of the fly being studied and its haunts broken up.

Tsi-nan, TSINANFU, a Chinese city on the Ta-tsin River. Glass and silk wares made. Pop. 300,000.

Tsze Hsi An, the late dowager empress of China, born in Manchuria. She became one of the wives of the emperor Hsien Fung, who ascended the throne in 1850. A woman of remarkable political acumen, she raised herself to the position of co-empress. On the emperor's death she put her son, Tung Chi, on the throne, acting as regent during his minority. From that time forward she was the practical ruler of China. On the death of Tung Chi, in 1875, she placed her nephew, Kwang Seu, an infant, on the throne, she again becoming regent. When he grew up and assumed control, his attempted reform movements led to his being deprived of authority by his despotic aunt, backed by the conservative party, and from that time to her death the government remained in her hands, the emperor being kept in a virtual captivity. She opposed reform, encouraged the Boxer movement, but a few years later, after the Russo-Japan war, became herself a reformer and took active steps to modernize Chinese administration and methods of education. In many respects a woman of unusual powers, the tendency of historians is to class her among the great women rulers of the world. From the death of her husband in 1861 to the time of her death, a period of nearly half a century, she was practically the ruler of China. She died November 15, 1908.

Tuam (tō'am), a town of Ireland, county of Galway, 129 miles northwest from Dublin. It is the seat of the Bishop of Tuam, and also of the Roman Catholic archbishop. Its principal edifices are the Protestant and Roman Catholic cathedrals, the bishops' palaces, and the college of St. Jarlath. Pop. 3012.

Tuamotu Islands (tō-a-mō'tō), PAUMOTU, or LOW ARCHIPELAGO, an extensive group of islands in the Pacific, lying eastwards from the Society Islands and south of the Marquesas. They are mostly under French protection, and have a population of 7000. They export pearls, mother-of-pearl, trepang, etc.

Tuaricks (tō'a-rikz), TUAREGS, or TAWÁRIKS, a race of nomads supposed to be connected with the Berbers in their origin, and inhabiting a great part of the Sahara desert between 5° W. lon. and 13° E. lon. They are of a handsome and muscular physique, of war-like habits, fierce and cruel disposition, and Mohammedans in religion. Their numbers are estimated at 200,000.

Tuber (tū'ber), in botany, an underground fleshy stem or appendage to the root, being usually an oblong

Tuberous Roots.

1, Palmate (*Orchis maculata*). 2, Didymous (*Orchis mascula*). 3, Fasciculate (*Ficaria ranunculoides*).

or roundish body, of annual duration, composed chiefly of cellular tissue with a great quantity of amylaceous matter,

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intended for the development of the stems or branches which are to spring from it, and of which the rudiments, in the form of buds, are irregularly distributed over its surface. Examples are seen in the potato, the Jerusalem artichoke, and arrow-root. Tubers are distinguished, according to their forms, into *didymous* (in pairs), *palmate* (hand-like), *fasciculate*, *globular*, *oblong*, etc.

Tubercle (tū'bėr-kl), a small aggregation of round cells and tubercle bacilli which tend to spread and invade surrounding tissues. In doing so it breaks down in the center into an opaque, yellowish or cheesy material, carrying the normal tissue with it in its destructive change. Tubercles may be developed in different parts of the body, but are most frequent in the lungs and mesentery. The tubercle bacillus in the lungs is the cause of the well-known fatal disease, pulmonary consumption.

Tuberculin, a sterile liquid containing the growth products of the tubercle bacillus, put forth as a cure for tuberculosis by Dr. Koch in 1890. It failed as a cure, but is used in diagnosing tuberculosis of cattle.

Tuberculosis (tū-bėr-kū-lō'sis) is the name applied to an infectious, contagious disease due to inoculation by a rod-shaped, microscopical germ, the *Bacillus tuberculosis*, measuring in diameter 0.25 and in length 1.5 to 3.5 micromillimeters. There are two varieties, the human and the bovine, the former being the longer. The tubercle bacillus attacks chiefly the warm-blooded animals, being common among the domestic creatures — fowls, cows, pigs, etc.; the horse is only slightly susceptible to infection. The guinea-pig, while comparatively immune to infection, is very susceptible to inoculation.

The bacillus gains entrance into the body through wounds, the air inhaled, or food ingested. It reaches the blood stream, where the bacilli multiply and are carried throughout the body, no organ or tissue being exempt from their ravages. The bacilli produce a toxin, which is disseminated throughout the system by the blood. In the various tissues the bacilli lodge and multiply and around them is formed the characteristic tubercle, which gives the name to the bacillus and the disease. The tubercle is a small nodule, which may be white, gray, or yellow in color. The smallest tubercles are called miliary. These may be many or few in any particular area. The tubercle is a mass of epithelioid cells with large, oval nuclei and glistening, nuclear bodies. In the center are so-called 'giant cells,' which are round or oval, with prolongations, and containing from 20 to 100 round or oval nuclei, which in old giant cells are arranged in a chain around the periphery. Outside the epithelioid cells is a zone of lymph cells from the blood. In old tubercles the center undergoes a cheesy degeneration, due to lack of blood supply in the center. Sometimes a fibrous capsule surrounds and imprisons the tubercle. The severity of any case of tuberculosis is proportionate to the number of tubercles present.

Any injury may provide an entrance for the germs, as they may be floating in the air at the time. A person may inhale them at any moment, since a tuberculous person may be exhaling them in the vicinity or they may be wafted by the breeze from a distance. Or a tuberculous person may expectorate them and after the sputum has been desiccated they may then be blown about. The mere inhalation of the germs, however, will not produce the disease, as the tissues of the body may be able to destroy or cast off the bacilli. Attendants in tuberculosis hospitals, exercising proper care, do not become infected. But should a sickly person inhale them, his likelihood of escaping the disease is not so good, and if a well person harboring the germs becomes ill of some acute inflammatory disease — cold, pneumonia, influenza, etc.— tuberculosis may then start up. Prolonged exposure to the exhalations from tuberculous persons in poorly ventilated apartments, as in crowded tenements; the faulty disposal of tuberculous sputum; the coughing by the tuberculous into non-tuberculars' faces; infecting the pockets by placing spit-cloths therein, are modes of infection. Foul air, overcrowding, lack of sunshine, dark houses, dampness, combined with low altitude and insanitary conditions generally are all potent factors in the propagation of the disease. Direct contagion by kissing is possible and also may occur by using eating and drinking utensils after a tuberculous person that have not been sterilized. Infection by tuberculous meat eaten in a partially raw condition has been frequently demonstrated, as well as by contaminated milk. The latter is thought to be the source of intestinal tuberculosis in children. The eating of tuberculous meat has probably been pretty well eradicated by careful inspection of abattoirs and veterinary bacteriological inspection, but vigilance in this direction must not be relaxed. All meat should be thoroughly

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cooked to kill all germs that may have found a lodgment therein. The disease is not hereditary, but a predisposition is transmitted to offspring.

Tuberculosis is to be prevented by strict attention to hygienic rules. Tuberculous persons should not swallow their sputum nor expectorate it on the ground or pavement or into cuspidors, but carefully eject it into impermeable receptacles, without soiling their hands, clothes, or the receptacle. All the sputum receptacles should be destroyed by fire. All eating utensils of the tuberculous should be sterilized by thorough boiling, as also should all their clothes, though the latter may be fully sterilized by exposure to formaldehyde gas for twenty-four hours. All meat and milk should be freed from tubercle by veterinary inspection of herds. All excreta from the tuberculous should be sterilized by fire, 5 per cent. carbolic acid solution, or 4 per cent. chlorinated lime solution. Much fresh air should be admitted to rooms which human beings and animals inhabit. The tuberculous should avoid kissing and fondling others. Bedrooms should be cleansed with moist cloths and not have the dust swept into the air. Sunlight and fresh air are the enemies of germs.

Tuberculosis is the most widespread and fatal disease to which man is heir, about 40 per cent. of deaths in cities being due to it. Longitude and latitude have but slight influence upon its prevalence, though altitude appears to exert a more or less controlling influence upon the life of the tubercle bacillus.

Tuberculosis of the skin is called lupus and contains tubercles. Eventually large areas of skin are transformed into reddish, ulcerated patches, more or less deep, with pockets of yellowish, purulent matter. It is treated by X-ray, Finsen's phototherapy, radium, surgical removal, and caustics. The lymph glands are attacked and enlarge and finally degenerate, surgical removal being required. The mucous membrane of the alimentary canal may become affected, tubercles, ulcerations, hœmorrhages and weakness resulting. If the ulceration is sufficiently deep to produce perforation, peritonitis or fistula may result, which latter is frequent in and around the rectum. The liver, pancreas, spleen, kidneys, and other viscera may be affected similarly.

The great tuberculous disease, however, is tuberculosis of the lung. There are two varieties of the disease — acute and chronic — and three successive stages. In this disease small nodules are scattered more or less profusely throughout the diseased areas. As the affection progresses the nodules enlarge and become more numerous, finally coalescing to form large masses of consolidated matter. When this liquefies, cavities are formed. If, with this infection, there is added some of the pus-forming bacteria, a more rapid variety is the consequence, and an irregular fever results. In the acute disease there is a sudden chill, fever, pain in the side, cough, and bloody sputum. In a fortnight a mucopurulent expectoration occurs, which may contain the bacilli. Then are found chills, fever, and drenching sweats; the fever is higher in the evening than in the morning; the heart is weak and rapid, breathing is difficult, and the tubercular gradually sinks. The chronic disease begins usually as a bronchitis, though it may come on stealthily with no prodromal signs. People usually describe it as a severe cold that settles on the chest and cannot be gotten rid of. There is some cough, dry at first, but later profuse expectoration, fever, and emaciation occur. There are gradual loss of strength and appetite, anæmia, profuse or slight hœmorrhage. This may continue for a long period of time or suddenly get worse.

It is treated by cold, dry air at an elevation of 2000 or 3000 feet above sea level, which is stimulating to the tissues, arousing Nature's forces to repel the bacteria and excrete the toxins. They should remain outdoors the entire time, summer and winter, if possible, only protected from storms. Buildings with removable sides, or large sashes, constructed of a material to withstand strong chemical disinfectants, should be occupied, and the body will adapt itself to the environment, provided warm clothing is worn. At a lower altitude in damp weather ventilation is secured by having open the windows in an adjoining apartment and an open fireplace in the room occupied. Personal hygiene is imperative, as are the preventive measures already given. An impermeable sputum flask should receive the expectoration. The tubercular requires good nourishment. Milk, cream, meat, eggs, butter, vegetables, and game should be liberally provided. Tuberculin is administered sometimes by hypodermic injection until the person no longer reacts to it.

Tuberose (tū'be-rōs; *Polyanthes tuberōsa*), a plant of the nat. order Liliaceæ, originally brought from the East, and now largely cultivated in American gardens both for its perfume and for its beautiful white flowers. It has a bulbous root, and an upright branchless stem growing to the height

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of 3 or 4 feet. It is cultivated for the perfumers in France and Italy.

Tubicolæ (tū-bik'u-lē; 'tube-dwellers'), an order of annelids, comprehending those which live in calcareous tubes, composed of secretions from the animal itself, as in serpula (which see); in tubes composed of sand and fragments of shell connected together by a glutinous secretion, as in terebella; or in a tube composed of granules of sand and mud, as in sabella.

Tübingen (tü'bing-in), a town of Würtemberg, in the circle of the Schwarzwald (Black Forest), on the Neckar, 18 miles southwest of Stuttgart. It is irregularly built, and the streets are for the most part steep and narrow, but the environs are picturesque. There are various manufactures, but the town is supported chiefly by the university, which was founded in 1477. It has a library of 300,000 vols., a botanic garden, chemical laboratories, collections of zoölogy and comparative anatomy, of minerals, of coins and medals, etc. The number of teachers is nearly 100, of students over 1200. Reuchlin and Melanchthon were professors here, as was also F. C. Baur, who founded the Tübingen school of theology, a school which has been distinguished by its critical method, and its tendency to the rejection of the supernatural element in Christianity. Pop. 16,809.

Tubipora (tu-bip'o-ra), a genus of corals belonging to the order Alcyonaria, and represented by the familiar organ-pipe coral (*T. musica*), and by other species.

Tubuai Islands (tö-bö-ī'), a group in the Pacific Ocean, south of the Society Islands, and, like them, under France.

Tubular Bridge. See *Bridge*.

Tuckahoe (tuk-a-hō'), a singular vegetable found in the southern seaboard section of the United States, growing underground, like the European truffle. It is also called *Indian bread* and *Indian loaf*. It is referred to a genus, *Pachyma*, of spurious fungi, but in all probability it is a peculiar condition of some root, though of what plant has not been properly ascertained.

Tucker (tuk'er), ABRAHAM, an English miscellaneous and philosophical writer, born in 1705; died in 1774. He was educated at Oxford, lived the life of a private country gentleman, and published his chief work, *The Light of Nature*, under the pseudonym of Edward Search. It has been frequently republished.

Tucker, ST. GEORGE, jurist, was born in Bermuda in 1752; died in 1827. While he was still a boy his father removed to Virginia and he entered the William and Mary College, where he was graduated in 1772. He studied law, and during the Revolutionary war served in the patriot army. In 1778 he married Mrs. Randolph, mother of the celebrated John Randolph of Roanoke. After the war he became a judge and also professor of law in William and Mary College, was made judge of the State Court of Appeals in 1803, and of the United States Court for the eastern district of Virginia in 1813. He published numerous works in prose and verse, and was especially happy in *vers de société*.— HENRY ST. GEORGE TUCKER, his son, was born in Virginia in 1781; died in 1848; studied law under his father, and like him became eminent in the profession. He was professor of law in the University of Virginia, chancellor of the fourth judicial district, president of the State Court of Appeals, and a member of Congress 1815-19. He wrote *Lectures on Constitutional Law* and other legal works.— BEVERLEY TUCKER, another son, born in 1784; died in 1851. He also became a lawyer, and served as a judge in Missouri from 1815 to 1830. From 1834 to his death he was professor of law in William and Mary College. He wrote legal works and several novels, one of which, *The Partisan Leader*, published in 1836, in a measure foreshadowed the secession movement of 1861. In the convention at Nashville in 1850, his vigorous invectives against the North recalled the speeches of his half-brother, John Randolph of Roanoke.— GEORGE TUCKER, a nephew of St. George Tucker, was born in Bermuda in 1775; died in 1861. He came to Virginia in 1787, studied law under his uncle at William and Mary College, and was a member of Congress from 1819 to 1825, when he became professor of ethics and political economy in the University of Virginia, holding this position for twenty years. He wrote a standard *Life of Thomas Jefferson;* a *History of the United States*, down to 1840; *The Valley of the Shenandoah*, a novel, and *A Voyage to the Moon*, a satirical romance. Most of his later life was spent in Philadelphia.

Tuckerman (tuk'er-man), HENRY THEODORE, an American man of letters, born at Boston in 1813; died in 1871. His writings are very numerous, and consist mainly of monographs relating to biography, literature, and art. Among the best known are

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Italian Sketch Book; Artist Life; The Optimist; Characteristics of Literature; Essays, Biographical and Critical, etc.

Tucson (tuk'sun), a city, the capital of Pima county, Arizona, 130 miles S. E. of Phœnix. It is the seat of the University of Arizona and of St. Joseph's Academy. The chief industries have to do with mining and stock-raising. Hides, wool, and metals are dealt in. Pop. 13,193.

Tucum (tö'kum), a species of palm (*Astrocaryum vulgāre*) of great importance to the Brazilian Indians, who make cordage, bow-strings, fishing-nets, etc., from the fine durable fiber consisting of the epidermis of its unexpanded leaves. The name is also given to the fiber or thread, and to an oil obtained from the plant.

Tucuman (tö-ku-man'), or SAN MIGUEL DE TUCUMAN, a town of the Argentine Republic, capital of the province of the same name, in the northwest of the country, near the foot of a mountain range on the Upper Rio Dulce. It is a rising place, connected by railway with Buenos Ayres. Pop. about 55,000. The province is fertile, and has a fine climate; area, 8950 sq. miles. Pop. 263,079.

Tudela (tö-thā'lä), a city of Spain, province of Navarre, on the right bank of the Ebro, 156 miles northeast of Madrid. It has an ancient cathedral and other churches, a medical college, etc. Pop. 9499.

Tudor (tū'dur), the family name of an English royal line founded by Owen Tudor of Wales, who married the widowed queen of Henry V. The first of the Tudor sovereigns was Henry VII; the last, Elizabeth. See *England*.

Tudor Architecture, Hengrave Hall, Essex, 1538.

Tudor-flower, a trefoil ornament much used in Tudor architecture. It is placed upright on a stalk, and is employed in long rows as a crest or ornamental finishing on cornices, ridges, etc.

Tudor Style, in architecture, a name frequently applied to the latest Gothic style in England, being the last phase of the perpendicular, and sometimes known as *Florid Gothic*. The period of this style is from 1400 to 1537; but the term is sometimes extended so as to include the Elizabethan period also, which brings it down to 1603. It is the result of a combination of the Italian style with the Gothic. It is characterized by a flat arch, shallow moldings, and a profusion of paneling on the walls.

Tuesday (tūz'dā), the third day of our week, so called from the Anglo-Saxon god of war, *Tiu*. See *Tyr*.

Tufa (tū'fa), or TUFF, the name originally given to a kind of volcanic rock, consisting of accumulations of scoria and ashes about the crater of a volcano. The name is now applied to any porous vesicular rock; thus rounded fragments of greenstone, basalt, and other trap-rocks, cemented into a solid mass, are termed *trap-tuff*, while a vesicular carbonate of lime, incrusting and incorporating twigs, moss, shells, and other objects that lie in its way, is called *calc-tuff*.

Tuileries (twē'le-riz; from Fr. *tuile*, a tile, because the spot on which it is built was formerly used for the manufacture of tiles), the residence of the French monarchs, on the right bank of the Seine, in Paris. Catharine de' Medici, wife of Henry II, began the building (1564); Henry IV extended it, and founded the old gallery (1600); and Louis XIV enlarged it (1654), and completed that gallery. The side towards the Louvre consisted of five pavilions and four ranges of buildings; the other side had only three pavilions. During the revolution of 1830 the palace was sacked. It was restored by Louis Philippe to its former splendor, but in 1848 it was again pillaged. The Tuileries then became successively a hospital for wounded, a picture gallery, and the home of Louis Napoleon in 1851. On May 23, 1871, it was almost totally destroyed by fire (the work of the communists), and the remaining portions were removed in the year 1883.

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Tula (tō'lȧ), a government of Central Russia; area, 11,954 square miles. The surface is generally flat, and the principal rivers are the Oka, the Upa, and the Don. By canal there is communication with the Baltic, the Black Sea, and the Caspian. Much grain is produced, and vast numbers of horses, cattle, and sheep are reared. Iron is smelted and manufactured to a large extent. Pop. 1,662,600.— TULA, the capital, is situated on the Upa, 107 miles south of Moscow. It is the residence both of a civil and a military governor, the see of a bishop, and has extensive manufactures of firearms, as also cutlery, ornamental steelworks, platina snuff-boxes, silks, hats, soap, candles, cordage and leather. Pop. 136,530.

Tula-metal, an alloy of silver, with small proportions of lead and copper, forming the base of the celebrated Russian snuff-boxes popularly called platinum boxes.

Tule (tō'le), a large species of rush or sedge, *Scirpus validus*, nat. order Cyperaceæ, which grows to a great height, and covers large tracts of marshy land in parts of California, being also found generally throughout the United States.

Tulip (tū'lip), a genus of plants (*Tulipa*), nat. order Liliaceæ. The species are bulbous herbaceous plants, inhabiting the warmer parts of Europe and Asia Minor, and are now extensively cultivated in gardens. About forty species have been described, of which the most noted is the common garden tulip (*T. gesneriana*), a native of the Levant, now an ornament in American gardens. Upwards of 1000 varieties of this plant have been enumerated. The wild tulip (*T. sylvestris*) has yellow flowers, and blooms in April and May. The sweet-scented tulip (*T. suaveölens*), prized for its fragrance, is grown in the United States. About the middle of the seventeenth century an extraordinary tulip mania prevailed in Holland. Enormous sums were given for bulbs, the ownership of a bulb being often divided into shares, in which men speculated as they do in ordinary stocks or shares. The close of this mania led to great losses.

Tulip-tree, an American tree bearing flowers resembling the tulip, the *Liriodendron tulipifera*, nat. order Magnoliaceæ. It is one of the most magnificent of the forest trees in the temperate parts of North America. Throughout the States it is generally known by the name of tulip poplar, white wood, or canoe-wood. The wood is light, compact, and fine-grained, and is employed for various useful purposes. The bark, especially of the roots, has an aromatic smell and bitter taste, and has been used in medicine as a tonic and febrifuge.

Tulle (tul), a town of France, capital of the department of Corrèze, situated on the Corrèze, 115 miles N. N. E. of Bordeaux. It has a cathedral and episcopal palace, a communal college, a diocesan seminary, courthouse, etc., and manufactures of firearms, wax-candles, playing-cards, leather, and the famous Point de Tulle lace. Pop. 11,741.

Tulle, a kind of silk open lace manufactured at Tulle in France in narrow strips, and much used on ladies' caps, etc.

Tulloch (tul'uk), JOHN, theologist, born in 1823 at Bridge of Earn, Perthshire; died in 1886. He was an influential leader in the councils of the Scotch Church, was for many years principal of St. Mary's College, St. Andrews, and was the author of the Burnet prize essay on *Theism* (1855), *Leaders of the Reformation* (1859), *English Puritanism and its Leaders* (1861), *Rational Theology and Christian Philosophy in England in the Seventeenth century* (1872), *Pascal* (1878), *Facts of Religious Life* (1877), etc.

Tullus Hostilius (tul'us hos-til'i-us), according to the legend, third king of Rome and successor to Numa Pompilius (B.C. 670-638), a warlike monarch, in whose reign took place the combat of the Horatii and Curiatii.

Tultcha (tult'cha), a town of Roumania, on the Danube, which near it divides into its three chief mouths. It has a good trade. Pop. 18,880.

Tulsa, a city in Tulsa Co., Oklahoma, 14 miles N. N. E. of Sapulpa. It is the center of a vast oil-producing region. Among the industries are: oil refining, coal mining, wheat milling, etc. Pop. 28,240.

Tumbrel (tum'brel), TUMBRIL, a covered cart or carriage with two wheels, which accompanies troops or artillery, for conveying the tools of pioneers, cartridges, and the like.

Tumor (tū'mur), in surgery, in its widest sense, a morbid enlargement or swelling of any part of the body or of any kind; more strictly, however, it implies a permanent swelling occasioned by a new growth, and not a mere enlargement of a natural part, which is called hypertrophy. Tumors may be divided into two well-defined classes: (*a*) *Simple, benign*, or *innocent*

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tumors, the substance of which has anatomical resemblance to some tissues of the body; they gradually increase in size, and generally only produce inconvenience from the great bulk they sometimes attain; a complete cure may be effected by simple excision. (*b*) *Malignant tumors*, which bear no resemblance in substance to normal tissue; they are exceedingly liable to ulceration, they invade all the textures of the part in which they occur, affecting the mass of the blood, and terminate fatally; when excised they are apt to recur not only in the immediate neighborhood of the previous site, but also in remote parts of the body. This recurrence in remote parts is due to transference of some of the elements of the tumor by means of lymphatic or blood vessels. Hence if a malignant tumor is to be excised it must be done early to avoid such secondary infection if possible. Innocent tumors are often named from the tissues in which they occur, as *adipose* or *fatty tumors*, *fibrous tumors*, *cartilaginous tumors*, *bony tumors*, and the like. Of the malignant class cancer is a well-known example. See *Cancer*.

Tumuli (tū'mū-li), artificial mounds of earth or stone raised to mark the resting-place of the dead. They are very abundant in parts of the United States, the work of prehistoric Indians. See *Barrows*.

Tun, an old measure of capacity. The English *tun* of wine contained four hogsheads, or 252 gallons, but in English-speaking countries the gallon is now the highest legal measure of capacity.

Tunbridge Wells, a market town and watering-place of England, partly in Kent, partly in Sussex, 32 miles S. S. E. of London, 4 miles S. of Tunbridge. It has a spacious parade, a town hall, corn exchange, public halls, Pump Room for visitors taking the waters, Convalescent Home for Children, and manufactories of toys and fancy articles. The spring to which the place owes its origin and prosperity is chalybeate, and is considered very efficacious in cases of weak digestion. Pop. 35,703.

Tundras (tun'dras), a term applied to the immense stretches of flat, boggy country, extending through the northern part of Siberia and part of Russia, where vegetation takes an Arctic character. They are frozen the greater part of the year, and are very difficult to cross when not frozen.

Tungsten (tung'sten), a metal discovered in 1781; atomic weight 184; symbol W (from its other name *wolfram*). It has a grayish-white color and considerable luster. It is brittle, nearly as hard as steel, and less fusible than manganese. The ores of this metal are the native tungstate of lime and the tungstate of iron and manganese, which latter is also known by the name *wolfram*.

Tungûs (tun'gus), a term applied to certain Mongolian tribes in the northeast of Asia, consisting of nomadic and hunting peoples, spread over Eastern Siberia. In a wider sense the term Tungûsians is used to include the Manchus, who conquered China in 1644.

Tunic (tū'nik), an ancient form of garment in constant use among the Greeks. Among the Romans the tunic was an under garment worn by both sexes (under the *toga* and the *palla*), and was fastened by a girdle or belt about the waist. The term is also used ecclesiastically to denote a dress worn by the sub-deacon, made originally of linen, reaching to the feet, and then of an inferior silk, and narrower than the dalmatic of the deacon, with shorter and tighter sleeves.

Tunicata (tū-ni-kā'ta), an order of Molluscoida or lower mollusca, which are enveloped in a coriaceous tunic or mantle, provided with two orifices, the one branchial and the other anal, and covering beneath it a second tunic, which adheres to the outer one at the orifices. These animals are popularly named *sea-squirts*, and are found either solitary or in groups, fixed or floating, and sometimes joined together in a common mass. See *Ascidia*.

Tuning-fork, a steel instrument with two prongs, designed when set in vibration to give a musical sound of a certain fixed pitch. The ordinary tuning-fork sounds only one note — usually the middle or tenor C in America, and A in Germany; but some are made with a slider on each prong, which, according as it is moved up or down, regulates the pitch of the note produced.

Tunis (tū'nis), a country of North Africa, now a French protectorate, is bounded on the north and northeast by the Mediterranean, on the southeast by Tripoli, and on the west and southwest by Algeria; area, estimated about 51,000 square miles. The coast-line presents three indentations, forming the Bay of Tunis on the north and those of Hammamet and Cabes or the Lesser Syrtis on the east. The northwest portion of the country is traversed by the Atlas Mountains, which on their lower slopes have many fertile tracts, partly

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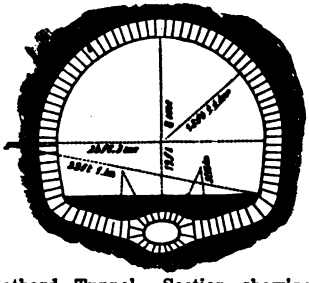
under culture. Between these mountains and the Gulf of Hammamet on the east stretches the extensive plain or plateau of Kairwan. The only river of any consequence is the Mejerdah. Agriculture is very much neglected; the principal crops are wheat, barley, and maize; olive plantations are numerous, while tobacco is largely, and cotton, indigo, saffron, and opium partially, grown. On several parts of the coast the fisheries, including that of coral, are valuable. The manufactures consist chiefly of woolen fabrics, soap, dyed skins, and ordinary and morocco leather. The inhabitants consist of a mixture of Moors and Arabs, along with Berbers, here called Kroumirs, occupying the elevated tract north of the valley of Mejerdah. In ancient times Tunis belonged to the Carthaginians, afterwards formed part of the Roman province of Africa, and many relics of Roman architecture remain. It was subdued about 675 by the Arabs, became a powerful state under independent rulers in the thirteenth century, and in 1575 was incorporated with the Ottoman Empire. In the spring of 1881 the French invaded Tunis, in order to punish the turbulence of the Kroumirs, and the French minister resident is now the virtual ruler of the country. Under French administration the Tunisian debt has been consolidated, commerce has increased, the means of transit have been improved, and a number of primary schools established. The resident army of occupation numbers 10,000 men. Pop. estimated at nearly 2,000,000.—**Tunis**, the capital city, is situated on a salt lagoon connected with the Bay of Tunis by a narrow channel, where is the port of Goletta, there being another salt lake on the other side of the city. Both Tunis and Goletta are built of the materials of ancient Carthage. Almost the only building of importance is the palace of the bey in the Moorish style; the bazaars are also interesting, and under French direction a cathedral and other buildings have been erected, and schools, etc., established. Pop. about 250,000, nearly half being Christians and Jews.

Minaret at Tunis.

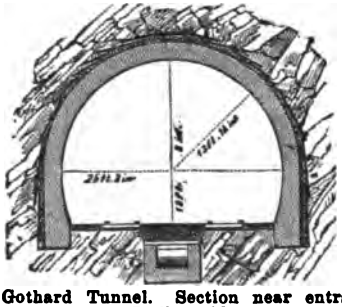
Tunkers. See *Dunkers.*

Tunnel (tun'el), a subterranean passage cut through a hill, a rock, or any eminence, or under a river, a town, etc., to carry a canal, a road, or a railway in an advantageous course. In the construction of canals and railways



St. Gothard Tunnel. Section showing construction in soft strata.

tunnels are frequently had recourse to in order to preserve the desired level and for various other local causes. Tunnels, when not pierced through solid rock,



St. Gothard Tunnel. Section near entrance on Italian side.

have usually an arched roof and are lined with brick-work or masonry. The sectional form of the passage is various. Among the greatest works of this kind are the tunnels of St. Gothard, Mont

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Cenis, the Arlberg, the Simplon, and the recently constructed Loetschberg, in the Alps. In Britain the Severn and Mersey tunnels are noteworthy, while in America the Hoosac tunnel and that through the Cascade range in the State of Washington are of much interest. (See the various headings.) Many important tunnels under rivers have been recently constructed, the most interesting being those under the Hudson and East rivers at New York, especially the great Pennsylvania Railroad tunnel, which passes under both rivers and under the city of New York. Another of interest is the tunnel under the Elbe, Germany, at Hamburg. Two great tunnels, through the Pyrenees from France to Spain, were completed in 1913.

Tunny (tun'i), a fish of the genus *Thynnus* and family Scombéridæ, the *T. vulgāris*, closely allied to the mackerel. These fish live in shoals in almost all the seas of the warmer and temperate parts of the earth. They are taken in immense quantities on the Mediterranean coasts, where the fishing is chiefly carried on. The flesh is delicate and somewhat resembles veal. The common tunny attains a length of from 4 feet to even 20 feet, and sometimes exceeds half a ton in weight. Its color is a dark blue on the upper parts, and silvery white below. The American tunny (*T. secundo-dorsālis*) is found on the American coast from New York to Nova Scotia. The albacore (*T. pacificus*) and the bonito are allied species.

Tunstall (tun'stal), a town of England, in Staffordshire, 2½ miles N. E. of Newcastle-under-Lyme. It has rapidly risen from a hamlet to a considerable town, with manufactures of china and earthenware, bricks and tiles, etc. The district is rich in coal and ironstone. Pop. of district 39,292.

Tupaia (tū-pē'ya), a genus of remarkable mammals. See *Banxring*.

Tupelo (tū'pe-lō), a North American forest tree of the genus *Nyssa*, the *N. denticulata*, nat. order Santalaceæ. It is a lofty tree of great beauty. The same name is given to other species of the genus, some of which are also called *black gum*, *sour gum*, *gum tree*, *piperidge*, etc.

Tupper (tup'er), SIR CHARLES, a Canadian statesman, born at Amherst, Nova Scotia, in 1821; died October 10, 1915. He was a representative for Nova Scotia in the British Parliament for many years, was premier of Nova Scotia, 1864–67, held various posts in the Dominion cabinet, and become premier of Canada in 1896, losing his post the same year. As minister of railways, 1879–84, he promoted the construction of the Canadian Pacific Railway. He was one of the commissioners who formed the fishery treaty of 1887–88, and was made a baronet in the latter year.

Tupper, MARTIN FARQUHAR, writer, born in London in 1810; died in 1889. He was educated at the Charterhouse and Christ Church, Oxford; studied law, and was called to the bar at Lincoln's Inn. He published a number of novels and plays, but his fame rests upon his *Proverbial Philosophy* (1838), a work in a kind of blank verse which has gone through numerous editions. His reminiscences are to be found in *My Life as an Author* (1886).

Turanian (tū-rā'ni-an), a term appellative of one of the great classes into which human speech has been divided, and including the Ugrian or Finnish, Samoyedic, Turkish, Mongolian, Tungusic, and possibly the Dravidian. It is called also *Altaic* and *Scythian*. It is characterized as *agglutinate* and *polysynthetic*, from the fact that its words are polysynthetic, or composed of several distinct words, each, even in composition, retaining its significance. See *Philology*.

Turban (tur'ban), a form of headdress worn by the Orientals. It varies in form in different nations, and different classes of the same nation. It consists of two parts: a cap without brim, fitted to the head; and a sash, scarf, or shawl, usually of cotton or linen, wound about the cap, and sometimes hanging down the neck.

Turbellaria (tur-be-lâr'i-a), an order of Annuloida, of the class Scolecida, almost all the members of which are aquatic and non-parasitic. There are two sub-orders, Planarida and Nemertida. See these articles.

Turbine (tur'bin), a kind of horizontal water-wheel, made to revolve by the escape of water through orifices, under the influence of pressure derived from a fall. Turbines are now made after a large variety of patterns. The oldest and simplest is the Scotch turbine, or Barker's mill (which see). In another common form the water passes vertically down through the wheel between the fixed screw blades, which gives it a spiral motion, and then strikes similar blades attached to a movable spindle, but placed in the opposite direction, so that the impact of the water communicates a rotary motion to the blades and spindles. Or the water may be passed from the center horizontally outwards through fixed curved blades, so as to give it a tangential motion, and thereby cause it to act on the blades of

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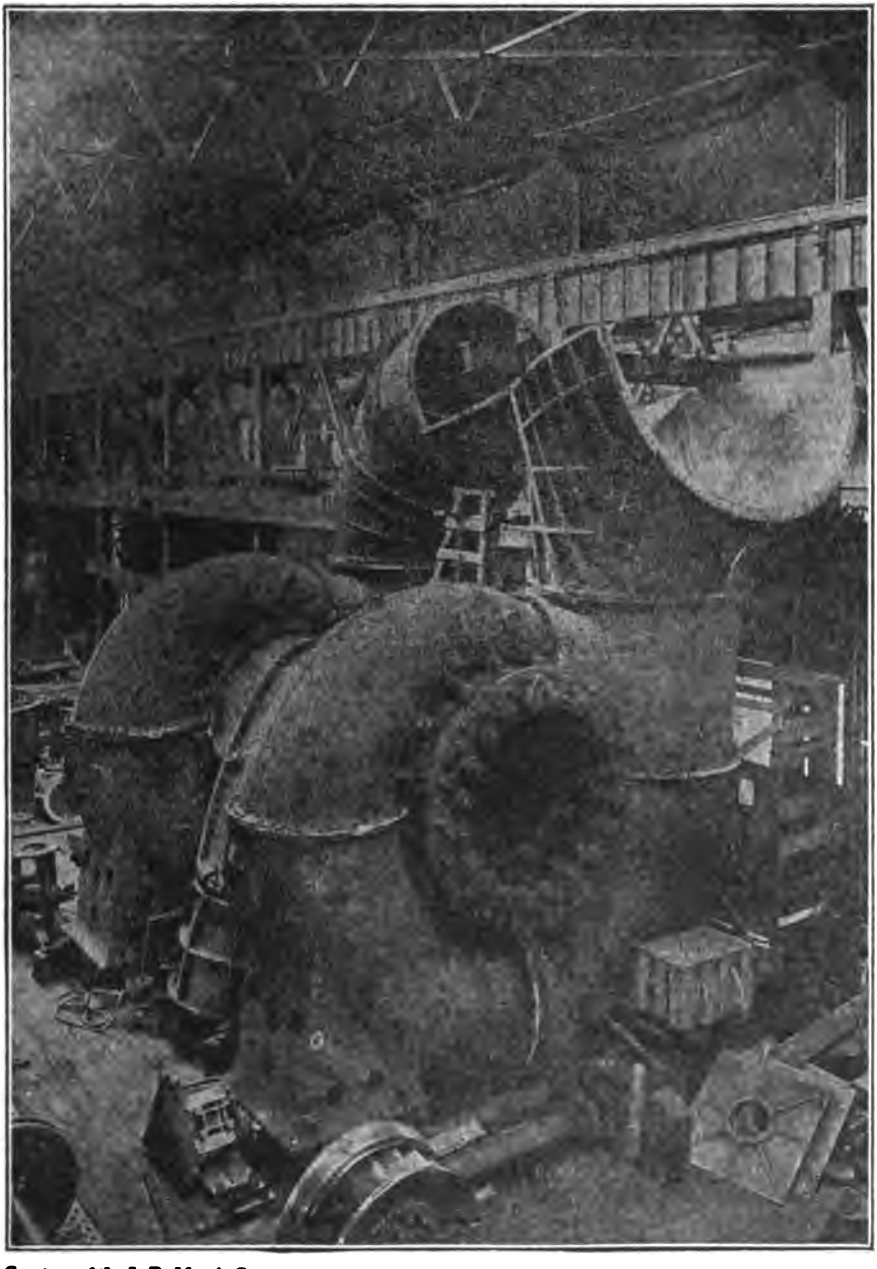

Courtesy of the I. P. Morris Co.

HYDRAULIC TURBINES

One of four 9000 horse power machines in course of erection. The water head required to operate them is 66 feet and the speed 150 revolutions per minute.

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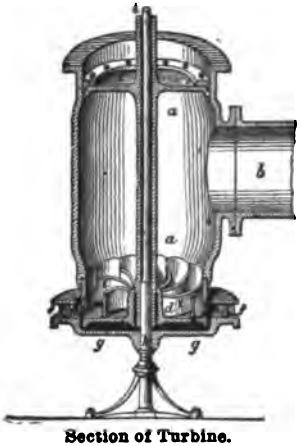
the wheel which revolves outside. In the annexed cut the water is introduced into a close cast-iron vessel *a* by the pipe *b*, connecting it with the reservoir. Here, by virtue of its pressure, it tends to escape by any aperture which may be presented; but the only apertures consist of those between a series of curved float-boards, *f f*, fixed to a horizontal plate *g*, mounted upon a central axis *h*, which passes upwards through a tube



Section of Turbine.

connecting the upper and lower covers, *c* and *d*, of the vessel *a*. Another series of curved plates *e e*, is fixed to the upper surface of the disk *d*, to give a determinate direction to the water before flowing out at the float-boards, and the curves of these various parts are so adjusted as to render the reactive force of the water available to the utmost extent in producing a circular motion in the disk and the axis *h* with which the machinery is connected. The turbine has, to a considerable extent, replaced the old-style water wheel, and has been adapted to steam engine purposes by substituting steam for water as the moving agent. See *Steam Turbine*, *Gas Turbine*.

Turbot (tur'bot), a well-known and highly esteemed fish of the genus *Rhombus* or *Pleuronectes* (*R.* or *P. maximus*), family Pleuronectidæ or flat-fishes. Next to the halibut, the turbot is the largest of the Pleuronectidæ found on the European coasts, and is the most highly esteemed for the table. It is of a short and broad form, brown on the upper side, which is usually the left side, and attains a large size, sometimes weighing from 70 to 90 lbs. The American or spotted turbot (*Rhombus maculatus*), common on the coasts of New England and New York, attains a weight of 20 lbs.

Turdus (tur'dus), the genus of birds to which the thrush belongs.

Turenne (tū-ren), HENRI DE LA TOUR D'AUVERGNE, VICOMTE DE, Marshal of France, born in 1611 at Sedan, was the second son of Henri de la Tour d'Auvergne, duke of Bouillon, and of Elizabeth, princess of Nassau-Orange. He learned the art of war under his uncles Maurice and Henry of Nassau in the Dutch service, entered the service of France in 1630, served with distinction in Germany and North Italy, and in 1643 received the command of the army of the Rhine in the Thirty Years' war, and was made a marshal. His successes in this post, as in the battle of Nördlingen (1645), greatly contributed to the close of the war. During the disturbances of the Fronde the victories of Turenne led to the termination of the civil war. In the war against Spain he also distinguished himself, and after its close in 1659 he was named marshal-general of France. When war was renewed with Spain in 1667 he conquered Flanders in three months. In the Dutch war of 1672 Turenne had the chief command. He first marched against the Elector of Brandenburg, and having driven him back as far as the Elbe forced him to sign the Treaty of Vossem in 1673; while in the brilliant campaign of 1674–75 he destroyed two Austrian armies by the battles of Mühlhausen and Türkheim, and conquered and devastated the Palatinate. In 1675 he was killed while making preparations to engage Montecuculi.

Turgot (tür-gō), ANNE ROBERT JACQUES, was born at Paris in 1727, and died in 1781. He was educated for the church, but renouncing this purpose he studied law, and in 1671 was appointed intendant of Limoges, which post he occupied for twelve years. Shortly after the accession of Louis XVI, in 1774, Turgot was appointed comptroller-general of France, and in order to reform the political and financial condition of the country he moderated the duties on articles of the first necessity, freed commerce from many fetters, and encouraged industry by enlarging the rights of individuals, and abolishing the exclusive privileges of companies and corporations. Such, however, was the opposition of the clergy and nobility to his reforms that he was dismissed from office in 1776, and retired into private life.

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Turgueneff. See *Tourguenieff*.

Turin (tū'rin; Italian, *Torino*), a city of North Italy, capital of province of same name, at the confluence of the Dora Riparia with the Po, and between those two rivers. The city is essentially modern, the streets being broad and regular, and many of them lined with arcades, while there are numerous wide squares and gardens. The chief buildings are the cathedral, a renaissance building, completed in the beginning of the sixteenth century, and remarkable for its marble façade; the royal palace, a plain brick building, which contains the king's private library, with valuable MSS., and the royal armory; the university, a fine edifice recently constructed, in which there is a large library; the Palazzo dell' Accademia delle Scienze, with a picture gallery and museums of natural history and antiquities; the Palazzo Carignano, used at one time by the Sardinian and Italian parliaments when they met here (1848–65), and now given up to a collection of natural history; the Madama Palace, an old and interesting building, and several theaters. The environs of the city are beautiful, and offer many objects of interest. Among the educational establishments, in addition to the university, which is attended by about 2700 students, are an episcopal seminary, a royal military academy, a polytechnic school, and various other colleges and schools. The manufactures consist, besides the staple of silk, chiefly of woolens, cottons, linen, paper, ironmongery, earthenware, and porcelain. Turin was anciently the capital of a tribe called the Taurini, and under the Roman Empire was called Augusta Taurinorum. It was long the capital of Savoy, then of the Sardinian kingdom, and from 1861 to 1865 of United Italy. Pop. 427,106.

Turkestan (tör-kes-tän'), a wide region of Central Asia, roughly divided into two portions, Eastern Turkestan and Western Turkestan. Eastern or Chinese Turkestan is inclosed on three sides by lofty mountain ranges (Thian-Shan, Karakorum, Kuen-Lun), and on the east has the desert of Gobi. Near the center is the basin of the Lob-nor, a lake fed from the west by the Tarim and its tributaries. The greater part of this area is uncultivated steppe, but there are fertile portions watered by the rivers Kashgar, Yarkand, and Karakash. The products include cereals, root-crops, and cotton in large quantities, partly manufactured in the country. Carpets and felt cloths, along with silk, which the country produces abundantly, are exported to India, Kashmere, and Tibet; while opium, tea, linens, and woolens are imported. The inhabitants, who are mostly Mohammedans, are very mixed. In 1863 a rebellion broke out, and after a war of several years Eastern Turkestan succeeded, under Yakoob Beg, in effecting its separation from the Chinese Empire, but after his assassination, in 1877, it was again brought under Chinese sway. The chief towns are Kashgar and Yarkand, and the pop. is estimated at about 2,000,000. — WESTERN TURKESTAN comprises the Trans-Caspian districts, the Turkoman steppes, the khanates of Bokhara and Khiva, and the oasis of Merv. This immense region, under the government or protection of Russia, is watered by the Oxus or Amu Darya, and the Jaxartes or Syr Darya. Maize, millet, rice, and cotton are cultivated in the oases along the rivers and on the slopes of the hills, and trade has greatly increased since the Russian occupation. Pop. estimated at between 5,000,000 and 6,000,000.

Turkestan, a town of Asiatic Russia, in Syr Darya province, 145 miles N.W. of Tashkend. It was formerly an important place of pilgrimage, and its mosque, built by Tamerlane, is one of the most striking edifices in Central Asia. Pop. 11,592.

Turkey (tur'ki), a Mohammedan empire of Southeastern Europe and Western Asia, under the rule of a sultan. In Europe it now occupies a small portion of the Balkan peninsula, and in this portion is situated the capital, Constantinople, but the larger part of Turkey is in Asia. The *immediate* possessions of Turkey in Europe, or those directly under the sultan's rule, until the Balkan war extended from Montenegro, Bosnia, Servia, and Bulgaria on the north to the Ægean and Greece on the south, and from the Black Sea to the Adriatic, the Straits of Otranto, and the Ionic Sea. The Treaty of Berlin in 1878 greatly reduced the area under direct Turkish rule, besides confirming the independence and extending the limits of several of the formerly tributary states; and the Treaty of Bukharest in 1913, still further reduced the limits and power of Turkey. (See *Ottoman Empire* and *Balkan War*. The immediate possessions in Europe have an area of 11,100 sq. miles, pop. about 2,600,000; in Asia, 682,960 sq. miles, pop. 17,000,000; in Africa, 400,000 sq. miles, pop. 9,821,100. Egypt, however, has ceased for the present to be part of Turkey and Tripoli has come under Italian rule. The island of Crete or Candia, in the

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Ægean Sea, formerly possessed by Turkey, was at the close of the Balkan War left autonomous, its annexation by Greece being foreseen.

European Turkey.—European Turkey was by the Treaty of Bukharest at the conclusion of the Balkan War (1913) reduced to a very small area, including, however, the great strongholds of Constantinople and Adrianople. It stretches from the new eastern limits of Bulgaria and the Black Sea on the west and north to the Ægean and the Sea of Marmora on the east and south. Until 1913 Turkey included the provinces of Adrianople, Macedonia and Albania. (See *Balkan War.*) In 1908 the Turkish provinces of Bosnia and Herzegovina, which had been administered by Austria since the Congress of Berlin, in 1878, were formally annexed by the latter country. Turkey protested, but eventually accepted a payment of $12,500,000 from Austria as compensation for the provinces. In 1909 the independence of Bulgaria was also recognized by Turkey, on the assumption by Russia of $9,000,000 of the Ottoman national debt. The climate of European Turkey is Mediterranean, with sub-tropical rains and summer droughts. The temperature is variable, and owing to the cold north-east winds is much colder than that of other Mediterranean countries in the same latitude. There are few manufactures except in Constantinople and Adrianople. The special industries are tanning (recently established) and manufactures of fine muslins, velvets, silks, carpets and ornamental weapons. Until the outbreak of the Balkan War, Turkey was making substantial advance in agriculture.

Turkey in Asia comprises the peninsula of Asia Minor, the country intersected by the Euphrates and the Tigris, the mountainous region of Armenia between their upper courses and the Black Sea, the ancient lands of Syria and Palestine, and the coast strips of Arabia along the Red Sea and Persian Gulf. Omitting Arabia, the country consists mainly of (1) a high plateau traversed by the mountains of Taurus and Anti-Taurus, and stretching from the Archipelago to the borders of Persia; (2) a plateau of less elevation and extent (Syria and Palestine) traversed by the double range of Lebanon; and (3) the extensive plain of Mesopotamia on the Lower Tigris and Euphrates. (See *Asia Minor, Armenia, Kurdistan, Mesopotamia, Syria,* and *Palestine.*) The islands Chios, Lesbos, Rhodes, etc., belong to Turkey in Asia, while the island of Samos is a tributary principality, and Cyprus is held by Britain. The chief towns in Asiatic Turkey are Smyrna, Damascus, Bagdad, Aleppo, and Beyrout.

Commerce, Communications, etc.—The chief exports are raisins, figs, and dates, silk, cotton, wool, and mohair, opium, coffee, wheat, wine, valonia, olive-oil, and tobacco; while the imports are cotton, woolen, and silk goods, metals, iron, steel, glass wares, etc. Accounts are usually kept in *grush* or piastres, the value of which is something less than 4½ cents; a hundred piastres make a Turkish *lira* or gold *medjidié* (value about 36 cents), and 500 make a 'purse.' The unit of weight is the *oke*, equal to about 2¾ lbs. avoirdupois. The usual linear measure is the *arshin*, equal to 30 inches.

People.—The inhabitants of the Ottoman Empire are of very diverse races. First in order are the Osmanli Turks, who, as the dominant race, are diffused over the country. They are proprietors of the greater part of the soil, fill all the civil and military offices, live generally in towns employed in various trades, and are seldom agriculturists. The Greeks form the bulk of the population over great part of the Ægean coasts and islands, and constitute to a very considerable extent the mercantile and trading community of Turkey. Arnauts, or Albanians, are found in the west throughout Albania; the northwest is occupied by Servians; and Bulgarians inhabit the district south of the Danube and east of Servia and Albania. In Asiatic Turkey the Turks are an important element, but there are also numbers of Armenians, Arabs, Kurds, Jews, Greeks, Circassians, etc. The Turkish language belongs to the Turanian family of languages, and is allied to the Hungarian and the Finnish. The literature is considerable in bulk, but not very original, consisting in great part of translations from the Persian and the Arabic, and in recent times from European literature.

Government.—The head of the government of Turkey is a monarch, usually designated the sultan, regarded by the Turks as the caliph or head of Islam. His edicts bear the name of Hatti-sherif, and his government is often designated as the Sublime Porte. The public officers who conduct the administration under the sultan are divided into three classes. The first class is that of law and religion, and at their head is the Sheik-ul-Islam, who governs a judicial and ecclesiastical body called the Ulemas. The second class consists of the 'officials of the pen,' or the members of administration, and at their head is the grand-vizier or

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Sadrazam. The third class includes the 'officials of the sword,' at their head being the Seraskier or minister of war, and the Capudan Pasha or minister of marine. The supreme deliberative body is the divan or privy-council, with the grand-vizier at its head, other members being the Sheik-ul-Islam and the ministers of war, marine, finance, justice, education, commerce, etc. The immediate possessions of the Turkish Empire are divided into general governments or vilayets, at the head of each of which is a governor bearing the title of vali. The vilayets are themselves subdivided into sanjaks, administered by mutessarifs; and these again into kazas administered by kaimakans. Military service is obligatory on all Mohammedans. The service lasts twenty years: six with the Nizam and first reserve, eight years in the Redif, and six in the Mustafiz (equivalent to the German Landsturm). The army on a peace footing comprises about 375,000 of all arms and ranks; if put on a war footing it might contain 500,000 more. It is organized on a new system dating from 1887.

Finances.—The financial condition of Turkey is thoroughly unsound. From 1854 the state had contracted a series of foreign loans, the total nominal capital of which amounted to about $1,140,000,000 in 1877. In 1875 the government announced that they would pay half the interest on the debt, but in 1876 they declared themselves unable to pay anything. In 1881 an arrangement was effected by delegates of the bondholders who met at Constantinople. The capital of the debt was reduced to $532,185,000, and the Turkish government agreed to hand over the excise revenues to a commission representing the bondholders, so that interest to the extent of 1 per cent. has been paid since 1882. In addition to the foreign debt the country is burdened with an internal and floating debt. At the end of 1910 the debt remained about as above stated, with no immediate prospect of liquidation.

Religion and Education.—The established religion of Turkey is Mohammedanism, but Christianity under the Greek form is professed by a large majority of the Greeks and Bulgarians, while part of the Albanians are Roman Catholics. The educational system of Turkey, in accordance with the law of 1869, provides for the erection of elementary schools in every commune, and of secondary schools in the larger towns. The University of Constantinople, officially founded in 1900, has not yet been opened. There are law, military, and medical schools in that city. Roberts College, in the Christian section of the capital, is an important institution, of American origin.

History.— See *Ottoman Empire.*

Turkey, a large gallinaceous bird (*Meleagris gallo pavo*), well known as an inmate of the poultry yard. It is a native of North America, and was introduced into Europe in the sixteenth century. Wild turkeys abound in some of the forests of the United States, where they feed on berries, fruits, insects, reptiles, etc., their plumage being a golden bronze, shot with violet and green, and banded with black. On account of its size and the excellence of its flesh and eggs the turkey is one of the most valued kinds of poultry. There is another species, the Honduras or West Indian turkey (*Meleagris ocellata*), which derives its specific name from the presence of bright eye-like spots on the tail-coverts. It is not so large as the common turkey, but its plumage is more brilliant.

Turkey-buzzard, or TURKEY VULTURE, a rapacious bird belonging to the vulture family (Vulturidæ) and the genus *Cathartes* (*C. aura*): so named from its bearing a distant resemblance to a turkey. It is about 2½ feet long, and with wings extended about 6 feet in breadth, general color black or brownish. It inhabits a vast range of territory in the warmer parts of America. It is of importance in the cities of the southern United States as a destroyer of carrion, and is protected on account of its useful services in this direction.

Turkey-carpet, a carpet made entirely of wool, the loops being larger than those of Brussels carpeting and always cut. The cutting of the yarn gives it the appearance of velvet.

Turkey-red, a brilliant and durable red color produced by madder upon cotton cloth, and introduced from the East about the end of the eighteenth century. The processes which a fabric undergoes in receiving this dye are numerous, and vary in different establishments, but the most essential is the preliminary treatment of the fabric with oils or fats, combined with certain other substances, such as carbonate of potash or soda.

Turkey-stone, a very fine-grained siliceous slate, commonly of a greenish-gray, sometimes of a yellowish- or brownish-gray color. When cut and polished it is used for sharpening small cutting instruments.

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Turkomans (tur'kō-manz), a nomadic Tartar people occupying a territory stretching between the Caspian Sea and the Sea of Aral, the khanates of Khiva and Bokhara, Afghanistan, and Persia. They do not form a single nation, but are divided into numerous tribes or clans.

Turks, a widely spread race, supposed to have had its original seat in Turkestan or Siberia, but now extending from European Turkey through Asia to the shores of the Northern Ocean. Besides the Ottoman Turks or Osmanli of Turkey, the Turkomans, Kirghiz, Usbecks, Yakuts, etc., all belong to the Turkish race. See *Turkey*, *Ottoman Empire*, etc.

Turks Islands constitute the S. E. portion of the Bahama chain, and along with the Caicos Islands are a dependency of Jamaica, having a government of their own. The chief island is Grand Turk, about 7 miles long and 2 broad. Their chief export is salt. See *Caicos Islands*.

Turmeric (tur'me-rik), the dried tubers or rhizomes of *Curcuma longa*, nat. order Zingiberaceæ (ginger). It is largely employed in India and China as an important ingredient in curry powder. Unsized white paper, steeped in an alcoholic solution of turmeric, when dried, is employed as a test to detect alkalies, which change its color from yellow to reddish brown. Turmeric yields a yellow color, which has great brightness but little durability. It is also used medicinally in the East as a carminative.

Turner, CHARLES TENNYSON. See under *Tennyson*.

Turner (tur'ner), JOSEPH MALLORD WILLIAM, a great English landscape-painter, was born in London in 1775; died in 1851. His father, who was a hair-dresser, proposed to teach the boy that trade, but afterwards allowed him to follow his inclination, and in 1789 he entered the Royal Academy as a student. After remaining there for five years, and working actively at his profession for another five, during which period he sent to the exhibition no less than fifty-nine pictures, he was elected in 1799 an associate of the Royal Academy. In the two following years he exhibited fourteen pictures, and in 1802 was elected an academician. Till this date he had chiefly been known as a landscape-painter in water-colors, but thenceforth he turned his attention to oil-painting, and in the ensuing half-century produced at the Academy exhibitions upwards of 200 pictures. In 1807 he was elected professor of perspective in the Royal Academy, and the following year appeared his *Liber Studiorum*, or *Book of Studies*, which Charles Turner, Mr. Lupton, and others engraved. Other works by him which were engraved are his illustrations of Lord Byron's and Sir Walter Scott's poems; Roger's *Italy* and *Poems; The Rivers of England; The Rivers of France*, and *Scenery of the Southern Coast*. 'The reputation of Turner,' says Mr. R. N. Wornum, 'among landscape-painters stands alone, solitary, colossal; no man has displayed at the same time such great powers of generalizing and concentrating the beauties of nature. For half a century Turner produced a succession of great works, from 1790 to 1840. After this period, he fell, for the most part, into that vague trifling with mere effects of light and shade and color which has done so much for a time to almost destroy the great reputation he had justly acquired by his previously unrivaled works. He worked in three styles: the best of his early works resemble Wilson and the Poussins; in his second style Claude was his model; and in his third he competed with nature only. . . . As examples of his three styles may be mentioned the *Garden of the Hesperides*, the *Shipwreck*, and the *Sun Rising in Mist*, illustrating the first; *Crossing the Brook*, *the Morning of the Chase*, and *Apuleia in Search of Apuleius*, his second or Claude style; the *Rise*, and the *Fall of Carthage*, 1815 and 1817, showing his transition from this second style to his third and greatest, of which the *Bay of Baiæ*, *Caligula's Bridge*, and *Childe Harold's Pilgrimage*, painted between 1823 and 1832, are grand examples; and lastly, the *Fighting Temeraire*, painted in 1839, may be instanced as the indication of the point of final transition from the sublime to what we must call the ridiculous in some of those strange productions which occupied the last years of his prolonged life.' By his will he bequeathed all his pictures and sketches to the nation, on condition of a suitable building being erected within ten years for their reception. They have been placed in the Turner Gallery, occupying two rooms in the National Gallery.

Turner, SHARON, historian, was born in London in 1768; died in 1847. Educated at a private school in Clerkenwell, he was articled to and became an attorney in the Temple, but subsequently devoted his time to historical and philological researches. His chief works are: *History of the Anglo-Saxons* (three vols., 1799–1805); *History of*

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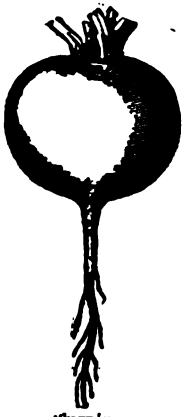
England (nine vols., 1799–1829); *Sacred History of the World* (three vols., 1832); and *Richard Third*, a poem (1845).

Turnhout (turn-hout'), a town of Belgium, province of Antwerp, 26 miles E.N.E. of the town of Antwerp. It has manufactures of linen, woolen, and cotton fabrics, colored paper, playing-cards, and various other industries. Pop. (1904) 22,162.

Turning (turn'ing), the art of giving circular and other forms to articles of wood, metal, bone, ivory, etc., by making them revolve in various manners in a machine called a *lathe*, and applying cutting instruments so as to produce the form required; or by making the cutting instrument revolve when the substance to be operated upon is fixed. See *Lathe*.

Turnip (tur'nip), the common name of the *Brassica Rapa*, a cruciferous, biennial plant, much cultivated on account of its esculent root, and of the same genus as the cabbage, cauliflower, and broccoli. The turnip, as a culinary vegetable and as a cattle food, was well known to the Greeks and Romans. The root is generally used as a culinary vegetable in all temperate climates, and in some countries the vegetable is cultivated on a large scale for feeding stock, the root being invaluable for this purpose. In the field culture of the larger-rooted varieties the most advantageous mode is by drills. The roots of the turnip have often a tendency to divide and become hard and worthless — a condition known as finger-and-toe, or dactylorhiza. The plant thrives best on a rich and free soil and in moist cloudy weather. There are several varieties, all apparently the result of cultivation. The Swedish turnip, which forms a valuable field crop, is probably a hybrid between *B. campestris* and *B. Rapa* or *Napus*, rape. *B. Napus* yields rape, cole, or colza seeds, from which a well-known fixed oil is expressed.



Turnip.

Turnip-fly, TURNIP-FLEA, the *Haltica nemŏrum*, a small coleopterous insect, very destructive to young turnips. It is common in British meadows from April to October, and may be recognized by two yellow stripes on its wing-cases. The name *turnip-fly* is also given to a hymenopter, the *Athalia centifolia*. The larvæ of this fly, popularly known as *niggers*, are very destructive to the leaves of the turnip.

Striped Turnip-fly (*Haltica nemŏrum*). *a a*, Natural size. *b b*, Magnified. *c*, Larva, natural size.

Turnpike (turn'pīk), a gate that may be set across a road, and is watched by a person appointed for the purpose, in order to stop carriages, carts, wagons, etc., and sometimes travelers, till toll is paid, for the cost and upkeep of the road. Such roads are called turnpike-roads, or simply turnpikes, and formerly were common in the Atlantic States, but recently tolls on roads have been very largely abolished. See *Roads*.

Turnspit (turn'spit), a name given to a variety of terrier dogs, from their being trained to turn the spits or roasting-jacks in mansions. The breed is now practically extinct.

Turnstone, a grallatorial bird of the plover family (*Strepsilas collāris*.) The length of the bird is about 9 inches. It takes its name from its practice of turning up small stones in search of the marine worms, minute crustaceans, etc., on which it feeds. It appears in most parts of the globe, and is found throughout North America, on the Atlantic and Pacific coasts.

Turnstone (*Strepsilas collāris*).

Turn-table, in railways, a circular platform of iron and wood, supported on rollers, and turning upon a center without much friction, even

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when loaded with a considerable weight. It is used for removing single carriages from one line of rails to another, and also for reversing engines on the same line of rails.

Turpentine (tur'pen-tin), an oleo-resinous substance flowing naturally or by incision from several species of trees, as from the pine, larch, fir, pistacia, etc. Common turpentine is obtained from the *Pinus sylvestris* or Scotch fir, and some other species of pine. Venice turpentine is yielded by the larch, *Larix Europæa;* Strasburg turpentine by *Abies picea* or silver fir; Bordeaux turpentine by *Pinus maritima* or maritime pine; Canadian turpentine, or Canada balsam, by *Abies balsamifera* or balm of Gilead fir; and Chian turpentine by *Pistacia Terebinthus.* All the turpentines dissolve in pure alcohol, and by distillation yield oils which are termed *spirits of turpentine.* Oil or spirits of turpentine is used in medicine externally as an excellent rubefacient and counter-irritant, and internally as a vermifuge, stimulant, and diuretic. It is also much used in the arts for dissolving resins and oils in making varnishes. Large quantities of it are obtained from the pine forests of the South Atlantic States.

Turpentine-tree, the name given to some species of trees of the genus *Pistacia,* nat. order Anacardiaceæ, which yield turpentine, as the *P. Terebinthus,* the Chian or Cyprus turpentine tree, *P. lentiscus,* the Mount Atlas mastic or turpentine-tree, etc. See *Pistachio.*

Turpeth (tur'peth), the root of *Convolvulus Turpethum* or *Ipomœa Turpethum,* a plant of Ceylon, Malabar, and Australia, which has a cathartic property. It is sometimes called *vegetable turpeth,* to distinguish it from *mineral turpeth.* See next article.

Turpeth-mineral ($Hg\ SO_4\ 2\ Hg\ O$), a name given to the yellow basic sulphate of mercury. It acts as a powerful emetic, but it is not now used internally. It is a very useful errhine in cases of headache, amaurosis, etc.

Turquoise (tur'koiz, tur'kwaz), a greenish-blue opaque precious stone, consisting essentially of a phosphate of alumina, containing a little oxide of iron and oxide of copper. The true or oriental turquoise, a favorite ornamental stone in rings and other articles of jewelry, is found only in a mountain region of Persia, and was originally brought into Western Europe by way of Turkey (hence the name).

Turret (tur'et), in architecture, a kind of small tower. Turrets are chiefly of two kinds, such as rise immediately from the ground, as staircase turrets, and such as are formed on the upper part of a building by being carried up higher than the rest.

Turret-ship. See *Ironclad Vessels.*

Turtle (tur'tl), the name given to the marine members of the order Chelonia, being reptiles which differ but little from tortoises, the name turtle or tortoise being in some cases applied indifferently. They are found in all the seas of warm climates, and feed chiefly on marine plants. The most important species is the green turtle (*Chelonia mydas*), which is from 6 to 7 feet long, and weighs from 700 to 800 pounds. Its flesh is highly esteemed as a table luxury.

Hawk's-bill Turtle (*Chelone imbricata*).

It is a native of the tropical parts of the Atlantic as well as of the Indian Ocean, being especially abundant near Ascension Island. The logger-head turtle (*Chelone* or *Chelonia caretta*) yields an oil which is used for lamps and for dressing leather. The hawk's-bill turtle (*C. imbricata*) is remarkable for the beautiful imbricated horny plates covering the carapace, and constituting the tortoise-shell of commerce. See *Tortoise.*

Turtle-dove (*Turtur communis*), a small variety of pigeon, about 11 inches in length, color pale brown marked with a darker hue above, a purple tinge pervading the feathers of the breast. They are in general smaller and more slender than the domesticated pigeons, and their cooing note is plaintive and tender.

Tuscaloosa (tus-ka-lö'sa), a city, capital of the county of that name, Alabama. It was once the capital of the state. It is situated on the Black Warrior River, 56 miles s.w. of Birmingham. Here is the University

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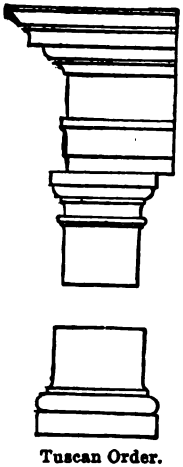
of Alabama and various other educational institutions. It is engaged in the coal and iron industries, has cotton manufactures, and is an important cotton shipping center. Pop. 8407.

Tuscan Order of Architecture,



Tuscan Order.

one of the five orders of architecture, according to Vitruvius and Palladio. It admits of no ornaments, and the columns are never fluted. Otherwise it differs so little, however, from the Doric, that it is generally regarded as being only a variety of the latter. See *Doric.*

Tuscany (tus'kā-ni; Italian, *Toscana*), formerly a grand-duchy, now a department of Italy; area, 9289 square miles. Pop. about 2,500,000. The chain of the Northern Apennines forms a considerable portion of its northern boundary, the sea being its boundary on the west. The principal river is the Arno. Cereals cover a large area, and vineyards, oliveyards, and orchards are numerous. The manufacture of silk is considerable. The marble of Tuscany, especially that of Siena, is well known. Tuscany corresponds to the ancient Etruria, which was, however, of wider extent. (See *Etruria.*) After the fall of the Western Empire (476) it passed successively into the hands of the Ostrogoths, Byzantine Greeks, and Lombards. Charlemagne made it a French province, and it was governed by marquises or dukes until the twelfth and thirteenth centuries, when it became broken up into a number of small republics, four of which were Florence, Pisa, Siena, and Lucca. From the first Florence occupied the leading place, and it gradually extended its territory. In 1569 Pope Pius I granted to Cosmo I the title of Grand-duke of Tuscany, and this position was retained, with interruptions, by the Medici family (which see) until 1737, when it passed to Francis Stephen, duke of Lorraine. In 1859, when under his descendant, the grand-duke Leopold, it was annexed to Sardinia by a popular vote, and in 1861 became, with Sardinia, part of the kingdom of Italy.

Tusculum (tus'kŭ-lum), an ancient Latin city, now in ruins, near the site of the modern Frascati, 15 miles S. E. of Rome. It was the birthplace of the elder Cato, and a favorite residence of Cicero. Many fine remains have been dug up in recent times, among them being the so-called Villa of Cicero, the Forum, theater, amphitheater, and ancient castle or citadel.

Tuskegee Institute (tus-kē'gē), a co-educational, non-sectarian institution at Tuskegee, Alabama, founded by Booker Washington in 1881 for the instruction of colored students in industrial pursuits. Aided by charitably disposed persons and managed with remarkable ability, it has played an important part in the development in industry of the negroes of the South. It has now 167 instructors and over 1600 students, with an endowment of nearly $2,000,000.

Tussar-silk (tus'ar), or TUSSEH-SILK, a coarse silk obtained from the cocoons of a wild native Bengal silk-worm. See *Silk.*

Tussilago (tus-si-lā'gō), colt's-foot, a genus of broad-leaved plants, nat. order Compositæ, sub-order Corymbiferæ. The species are natives of Europe and America. *T. Farfāra* (common colt's-foot) is found in the Northern and Middle States. See *Colt's-foot.*

Tussock-grass (tus'uk; *Dactylis cæspitōsa*), a large grass, of the same genus as the cock's-foot grass of the United States, a native of the Falkland Islands, Fuegia, and South Patagonia. It grows in great tufts or tussocks sometimes 5 to 6 feet in height, the long tapering leaves hanging over in graceful curves. The plant is a useful food for cattle, and several attempts have been made to establish it for that purpose.

Tussock-moth, a grayish-white moth about an inch long, the caterpillars of which do great mischief in hop grounds, and are known as hop dogs. The caterpillar is delicate green in color, with brush-like tufts of yellow hairs on several of the segments. It feeds on leaves throughout the summer, becomes a hairy chrysalis about September, and emerges as a moth in the following spring.

Tutenag (tū'te-nag), Chinese white copper, an alloy of copper 50, nickel 19, and zinc 31, used for table ware, etc. A small quantity of lead or iron is added in some formulas. It much resembles packfong, which is also called Chinese white copper.

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Tuticorin (tū-tē-kor'in), a seaport of India, a terminus of the South Indian Railway, 33 miles east of Tinnevelly, Madras. The roadstead is good, and the trade considerable. Pop. 28,048.

Tutor (tū'tur), (1) in many universities, the name given to scholars attached to the various colleges, by whom, assisted by private tutors, the education of the students is chiefly conducted. They are selected from the college. (2) In Scots law, the guardian of a boy or girl in pupilarity. By common law a father is tutor to his children. Failing him there may be three kinds of tutor, a *tutor-nominate*, a *tutor-at-law*, or a *tutor-dative*.

Tuttlingen (tōt'ling-en), a town of Würtemberg, on the Danube, near the Baden frontier. Pop. (1905) 14,627.

Tutuila (tō-tō-ē'lä), one of the largest of the Samoan or Navigators' Islands. It rises about 2000 feet above the sea, is covered with vegetation, and has the excellent harbor of Pango Pango, or Pago Pago. It was annexed to the United States in 1899. Pop. about 4000.

Tuyere (tū-yēr', or twē'yār). See *Blast-furnace*.

Tver (tvyār), a town of Russia, capital of the government of the same name, situated in a plain on the Volga, 96 miles northwest of Moscow. It consists of the Kremlin or fortress, surrounded by an earthen wall, and the town proper. The manufactures are numerous and varied. Pop. 45,644.—The government of Tver has an area of 25,225 square miles, and a population of 2,053,000. Rye, barley, hemp, and flax are largely cultivated, and the forests are extensive.

Twain, MARK. See *Clemens*.

Twat, an oasis group in the Sahara, southeast of Morocco, to which it is considered as belonging. The inhabitants are about 300,000 in number, partly Arabs, partly Berbers, and are fanatical Mohammedans.

Tweed (twēd), a river of Scotland, which rises in the south part of Peeblesshire, forms the boundary line between England and Scotland for 16 miles, runs through England for a short distance, and then enters the North Sea at Berwick; total length, 97 miles. Its waters abound with salmon and trout, and its name is celebrated in connection with some of the best literature of Scotland.

Tweed Ring, a political combination in New York City which, about 1868–71, secured control of the municipal elections and revenues, the latter of which were plundered of many millions of dollars. Its ruling spirit was William M. Tweed, who became the head of the Tammany organisation. He was brought to trial in 1873 and sentenced to prison for 12 years. He escaped in 1875, but was captured and brought back, and died April 12, 1878.

Twelfth-day, the twelfth day after Christmas, upon which is held the festival of Epiphany (which see). On the evening of this day, called Twelfth-night, various social rites and ceremonies are observed in different countries. One of these is the baking of a cake, into which a bean is introduced, the person who receives the bean being made king for the occasion.

Twickenham (twik'en-am), a town in Middlesex, England, on the Thames, nearly 11 miles S.W. of London. In the 18th century it was a fashionable resort. Pop. 29,374.

Twilight (twi'lit), daylight which continues after sunset, occasioned by the reflection of sunlight from the higher parts of the atmosphere which are still illuminated after the sun has become invisible from ordinary heights, and which contain floating matter which reflects the sun's beams. It is supposed to last till the sun is about 18° below the horizon, but is much influenced by the state of the atmosphere as to clouds, etc. The light preceding sunrise is also given this name. In low altitudes (that is, near the equator) there is little twilight.

Twilight Sleep, a method of inducing painless childbirth, worked out in the medical clinic of the University of Baden, and in 1914 reported to have been used successfully in 5000 cases in Freiburg, Germany. The 'twilight sleep' is a borderland condition between sleeping and waking, induced by the hypodermic injection of a small quantity of a combination of two drugs, scopolamine and morphine, which produces an unusual delicately balanced condition of consciousness in which the body loses all sense of pain, but retains the power of muscular contraction.

Twill, a textile fabric, in which the weft threads do not pass over and under the warp-threads in regular succession, as in common plain weaving, but pass over one and under two, over one and under three, etc.

Twin Falls, a city, county seat of Twin Falls Co., Idaho, near the Snake River, 120 miles S.W. of Pocatello. It is in an agricultural district. Pop. 8000.

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Twin Screw, a propeller of a steam-vessel, composed of two separate and parallel screws which revolve in opposite directions, thus giving increased power over a single screw propeller. The twin-screw system is now employed in the principal warships of the world, and triple-screws are used on many modern vessels.

Twiss, SIR TRAVERS, born in Westminster, England, in 1810. He was educated at Oxford; became a fellow and tutor in his college; was appointed successively professor of political economy at Oxford (1842–49); professor of international law, King's College, London (1852–55); professor of civil law in Oxford (1855–70); and advocate-general of the crown (1867–72). His chief works are: *The Oregon Question Examined* (1846), *View of the Progress of Political Economy in Europe* (1847), *Lectures on the Science of International Law* (1856), *the Law of Nations* (1863), and *Belligerent Right on the High Seas* (1884). He died in 1897.

Tyburn (tī'burn), a turnpike at the west end of Oxford Street, London, noted for the public executions of metropolitan malefactors which long took place near it. The turnpike was removed in 1829.

Tyche (tī'kē). See *Fortuna.*

Tyco Brahe. See *Brahe.*

Tyler (tī'ler), a town of Texas, capital of Smith Co., 19 miles N. W. of Troup. It has cotton and oil mills and other industries. Pop. 10,400.

Tyler, JOHN, tenth president of the United States, was born in Virginia, March 29, 1790. He studied law, was elected to Congress in 1816, and in 1825 became governor of Virginia and also succeeded John Randolph as United States Senator. He subsequently became identified with the Whig party, and in 1840 was elected Vice-President under the presidency of General Harrison. On Harrison's death in 1841 he succeeded as President, and as such came into collision with his party on the National Bank Bill and other questions. The annexation of Texas was the chief event of his term of office, at the end of which he retired into private life. On the outbreak of the Secession war he espoused the cause of the South, and was a member of the Confederate congress. He died in Richmond in January, 1862.

Tyler, MOSES COIT, historian, born at Griswold, Connecticut, in 1835. He graduated at Yale University in 1857, studied theology, and became a Congregational pastor in 1859. He was professor of English literature in Michigan University, 1867-72 and 1874-81, and literary editor of *The Christian Union*, 1872–74. He became priest in the Protestant Episcopal Church in 1883. He wrote *History of American Literature During the Colonial Period*, *Manual of English Literature*, etc. He died December 28, 1900.

Tyler, WAT, an English soldier who served in the French wars, and was one of the leaders in the rebellion of 1381 against the poll-tax (which see). He led the men of Kent upon London, where, after fire and pillage, they were partly dispersed by a promise of the king to grant them charters of freedom and amnesty. Tyler, however, remained with a body of the insurgents, and was met by the king next day at Smithfield, where, for his apparent insolence in the royal presence, he was stabbed by William Walworth, mayor of London.

Tylor, EDWARD BURNETT, anthropologist, born at Camberwell, England, in 1832. He devoted himself with much success to researches in the history of man and civilization; became president of the Anthropological Society, keeper of the Oxford University Museum, and reader in anthropology. He was appointed first Gifford lecturer at Aberdeen in 1888. His chief works are: *Researches into the Early History of Mankind; Primitive Culture;* and *Anthropology.* He was made professor of anthropology at Oxford in 1895.

Tympanum (tim'pa-num), (1) a cavity of an irregular shape situated in the ear. (See *Ear.*) (2) In architecture, the triangular space in a pediment included between the cornices of the inclined sides and the horizontal cornice; also, any similar space, as above a window, or the space included between the lintel of a door and the arch above it. The tympanum is often ornamented with carving or sculpture.

Tyndale, WILLIAM. See *Tindall, William.*

Tyndall (tin'dal), JOHN, physicist, born in 1820 at Leighlin Bridge, Carlow, Ireland; was educated in a neighboring school; joined the Irish Ordnance Survey in 1839; engaged in railway engineering for several years; was appointed teacher in Queenwood College, Hants; was elected to the chair of natural philosophy in the Royal Institution in 1853; visited Switzerland in 1856 along with Huxley, and made repeated investigations in that country subse-

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quently; lectured throughout the United States in 1872; and presided over the British Association in 1874 at Belfast. His chief works are: *The Glaciers of the Alps* (1860); *Heat Considered as a Mode of Motion* (1863); *On Radiation* (1865); *Sound* (1865); *Light* (1870); *The Forms of Water* (1872); *Floating Matter in the Air* (1881), etc. He died December 4, 1893.

Tyne (tīn), a river of England, formed by the junction near Hexham of the North Tyne, which rises in the Cheviots, and the South Tyne, which rises in the east of Cumberland. The united stream enters the sea at Tynemouth after a course from Hexham of nearly 30 miles. The Tyne has, since 1854, been the subject of large engineering operations, consisting of extensive dredging, the construction of piers at its mouth, the formation of large docks, and the building of a swing-bridge at Newcastle. These improvements have resulted in a great increase in its trade. See *Newcastle-on-Tyne*.

Tynemouth (tīn'mouth), a borough of England, county of Northumberland, at the mouth of the Tyne on its north bank. There are many handsome buildings, a parade nearly a mile long, the ruins of a picturesque old priory, an aquarium, winter-garden, baths, etc., and the place is much frequented for sea-bathing. The port of North Shields and several villages are included within the borough. Pop. 58,822.

Type (tīp), a rectangular solid of metal, wood, or other hard material having a raised letter, figure, punctuation mark, or other character on the upper end, which, when inked, is used to make impressions on paper and other smooth surfaces; the term is also used collectively. Types must be all of a uniform height, and perfectly true in their angles, otherwise they could not be locked firmly together to be printed from. The nicks *d d d* shown in figure are notches made on one side of the type to assist the compositor in distinguishing the bottom from the top; the *groove* (*e*) is a channel made in the bottom of the type to make it stand steadily. From the character of the letters types are known as CAPITALS, small or lower-case letters, *italics*, scripts, etc. From their size they receive the following names, the titles ranging from *brilliant*, which, however, is rarely used, to *English*, the largest type used in ordinary book work: —

Brilliant.....William Caxton was the first English Printer
Diamond.....William Caxton was the first English Printer
Pearl.....William Caxton was the first English Pri
Ruby.....William Caxton was the first Englis
Nonpareil.....William Caxton was the first Englis
Minion.....William Caxton was the first Eng
Brevier.....William Caxton was the first
Bourgeois.....William Caxton was the fir
Long Primer William Caxton was the
Small Pica.....William Caxton was th
Pica.....William Caxton was
English.....William Caxton
Brevier.....Black Letter or Old English

Late in the nineteenth century the 'point' system was adopted generally by printers. The old names with their nearest equivalent in the point system are as follows:

Brilliant	3½	point
Diamond	4	"
Pearl	4½	"
Ruby	5	"
Nonpareil	6	"
Minion	7	"
Brevier	8	"
Bourgeois	9	"
Long Primer	10	"
Small Pica	11	"
Pica	12	"
English	14	"

Types are made by casting (which is now done by machinery), the letter being first cut upon the end of a steel punch, and the punch then driven into a piece of copper, which forms the *matrix* or bottom of the mold intended to produce the letter. Type-metal is an alloy of lead, antimony, and tin. See *Printing*.

Type-setting Machine, a mechanical device for setting type. A machine for this purpose was patented in England as early as 1794, but the first in any way available was the Churd machine of 1822. This cast the types as well as set them. Various other machines were subsequently produced, but it was not until the last quarter of the century that any was invented that competed profitably with hand-setting. Of those now in use that set previously-cast types, there are two which may be named, the Thorne and McMillan machines. The first of these sets and distributes the type, while the second has separate machines for setting and distributing. Of type-casting machines, there are two in common use, the

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Merganthaler and the Lanston. The Merganthaler machine, perfected in 1884, is known as the Linotype, from the fact that it casts a line of type instead of single types. It has long been widely used in newspaper offices and is now largely employed in book setting. The Lanston, known as the Monotype, casts single types, a keyboard being used as in the Linotype, each key controlling the casting of a special type-letter, mark, space, etc. This is in considerable use, and there are other single-type machines on the market.

Typewriter, a machine intended to be used as a substitute for the pen, and by which the letters are produced by the impression of inked types. The essential elements in such machines are a movement to bring the type into position, an inking device, an impression movement, and means for letter and line spacing. A successful form of the machine has a series of letter keys arranged in rows, to be worked by the fingers of both hands, a letter being imprinted on the paper (which moves automatically) each time a key is struck. In recent years many type-writers have been brought before the public, such as the Remington, Hammond, Bar-Lock, etc., and improvements are made from time to time. In these there are two rows of keys, 29 in all. Each key works a lever to which is attached a capital letter, an ordinary Roman letter, and a figure. The capital letters and the figures are brought into play by means of two small shift stops, and the printing as it is performed is in full view of the operator. In others, as the Caligraph, Yost, and Smith Premier, there is a separate key for every character producible.

Typhaceæ (tī-fā'se-ē), a nat. order of monocotyledonous plants, characterized by their calyx being three-sepaled and half-glumaceous, or a mere bundle of long hairs, by their long lax filaments, clavate anthers, solitary pendulous ovules, and peculiar habit. The order includes two genera, *Typha* and *Sparganium*, the species of which are abundant in the northern parts of the world. They are herbaceous reed-like plants, growing in marshes and ditches. See *Reed-mace.*

Typhline (tif'lin), a curious lizard belonging to a family in which the eyes and ears are hidden under the skin. In the typical species, the common typhline (or blind acontias — *Typhlina Cuvierii*), the limbs are entirely wanting, and the animal looks utterly helpless, having no apparent legs, feet, eyes, or ears. It is a native of South Africa.

Typhoid Fever (tī'foid), called also enteric fever and gastric fever, a disease somewhat resembling typhus, but essentially different. It is characterized by serious disorder of the bowels, and is not infectious in the sense that it can be communicated from one person to another by breath or by the skin, as in scarlet fever and smallpox. The poison seems to consist of living organisms or disease germs which exist in the discharges from typhoid fever patients, may gain admission to the water of wells, and hence to the human stomach, through drinking water or that used to wash milk dishes. When these germs gain access to the alimentary canal of a person whose general health is impaired, the disease is usually set up. It is uncertain what time may elapse between the introduction of the poison and the appearance of the disease, but the period is usually about three weeks. The symptoms of the disease are languor, chills, violent headache, thirst, and pains in the limbs. Soon diarrhœa sets in, accompanied by a distended and tender state of the abdomen. The temperature rises, the skin loses its moisture, the kidneys cease to act freely, and the tongue becomes dry and brown. Then a rose-colored rash appears over the chest and abdomen, which may soon disappear, only, however, to be followed by a new crop of spots. At this stage delirium and other serious symptoms arise, and as the disease advances ulceration or perforation of the bowels may take place. While the symptoms here described are those of a typical case, there are numerous instances where the patient may have no marked looseness of the bowels, no spots on the skin, and no delirium. In the treatment of the disease the most important thing is the dieting. Only soft liquid foods are allowable, such as milk, in abundance, boiled bread and milk, corn-flour, etc. Looseness of the bowels, if excessive, should be checked by catechu and chalk mixture, with the addition of laudanum, if necessary, to a grown-up person. The disease is serious and often proves fatal. See *Vaccination.*

Typhon (tī'fon), the Greek designation of an Egyptian deity called Set or Seth, son of Seb, and brother to Osiris, whom he is said to have destroyed. He seems to have represented the volcanic forces of the earth.

Typhoon (tī-fōn'), a violent hurricane, especially one of those which rage on the coasts of China and

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Japan and the neighboring archipelago. They occur from May to November, but are most frequent and disastrous during the months of July, August, and September.

Typhus Fever (tī'fus), known also as hospital fever, jail fever, etc., is essentially a fever of the poor, ill-fed, and badly-housed inhabitants of large cities. It is infectious, and the infection is believed to be transmitted by germs carried by lice or other vermin. Free ventilation is the least favorable condition for the spread of typhus. Before the symptoms show themselves a period of from five to twelve days may pass after the person is infected. Then there is generally a shivering, followed by a hot, dry skin, a suffused condition of the eyes, a small pupil, thirst, a dull, stupid expression, great prostration, and costive bowels. About the seventh day a rash of irregular spots and of a dusky hue appears over the chest and back, but sometimes this is entirely absent. As the disease advances the patient's strength becomes exhausted, the urinary secretion is scanty, if not entirely suppressed, delirium sets in, and the disease is often complicated by bronchitis, pneumonia, or pleurisy. About the fourteenth day, in favorable cases, the turn of the fever is shown by the patient falling into a sound sleep, from which he awakes with the fever gone. In unfavorable cases the prostration increases, the feverishness is heightened, convulsions may occur, and at length the patient sinks into unconsciousness. The treatment consists in keeping the patient in a well-ventilated room, and preventing exhaustion by a light and wholesome diet. Milk, beef-tea, nourishing soups without vegetables, should be given to the patient in small quantities at short intervals.

Typography (tī-pog'ra-fi). See *Printing*.

Tyr (tir), in northern mythology, the son of Odin, brother of Balder, and the god of war and victory. He corresponds to the Anglo-Saxon Tiw, from whom Tuesday is named, and the day is similarly named among the Danes and Icelanders.

Tyrannus (tī-ran'us), a genus of insessorial birds. The best-known species is the tyrant fly-catcher (*T. Carolinensis*), which is remarkable for its bold and pugnacious disposition. It is a native of the United States, feeds on insects, and is not afraid to attack birds of prey much larger than itself. It is also called *tyrant-shrike* and *king-bird*.

Tyrant (tī'rant), originally, in ancient Greece, one who had usurped the ruling power without the consent of the people or at the expense of the existing government. Such a ruler, although he obtained his power illegally, did not always use it oppressively and violently; on the contrary, it was frequently used humanely and beneficently, and some tyrants were patrons of literature and art. In modern times the word has a different significance, indicating a cruel or oppressive ruler.

Tyrant Fly-catcher. See *Tyrannus*.

Tyre (tīr), one of the most celebrated cities of ancient Phœnicia, and with its elder sister, Sidon, long a great trading mart. It was built partly on an island and partly on the mainland; and the insular fortifications formed its chief strength when besieged and taken by Alexander the Great in B.C. 332. A mole or causeway then constructed to the island was the origin of the isthmus which now connects it with the mainland. Tyre was famous in the tenth century B.C. under Hiram, the friend of Solomon; was besieged in vain by the Assyrians in 725–720 B.C., and by Nebuchadnezzar, 585–572 B.C., and remained an important place till it came into the hands of the Turks. It was famous for a dye (the Tyrian purple) obtained from the shell-fish *Murex* (which see). The modern Tyre or Sur is an insignificant place of 6000 inhabitants, under the government of Beirut. See also *Phœnicia*.

Tyrol (tir'ol), or TIROL', a province of Austria (including Tyrol proper and Vorarlberg), is bounded north by Bavaria and Lake Constance, west by Switzerland, east by Salzburg and Illyria, south, east, and west by Venetia and Lombardy; area, 11,325 square miles. In magnificence of scenery Tyrol is only inferior to Switzerland, of which it is a continuation. The Alps enter it from Switzerland in three chains, of which the central (the Tyrol or Oetzthaler Alps) is the loftiest, and divides the country into North and South Tyrol. The drainage of North Tyrol is mainly carried to the Danube by the Inn, which is the only navigable river; that of South Tyrol is mostly conveyed to the Adriatic by the Adige. About one-third of the surface is practically inaccessible, another third is occupied by forests. The vine and cereals are cultivated, and minerals, especially iron and salt, are extensively worked. Silk, metal wares, wood articles, lace, and embroidery, are

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among the manufactures. The capital is Innsbruck. Pop. 850,062.

Tyrone (tī-rōn′), a county of Ireland, in the province of Ulster; bounded by Londonderry, Donegal, Armagh, Monaghan, and Fermanagh; area, 1260 sq. miles. The surface is hilly, rising into mountains in the north and south, and declining to a level towards Lough Neagh. The soil in the lower districts is fertile, and the county is watered by numerous branches of the Foyle and Blackwater. Agriculture generally is in a backward state. Coal is mined to a small extent near Dungannon in the eastern portion of the county; linens, woolens, earthenware, whiskey, beer, chemicals, etc., are made. Principal towns, Strabane and Dungannon. Pop. 150,567.

Tyrone, a borough of Blair Co., Pennsylvania, on the Little Juniata River, 14 miles N. E. of Altoona. It has extensive coaling interests, railroad shops, lumber and paper mills, etc. Pop. 8200.

Tyrrhenian Sea (tir-rē′ni-an), the name given to the part of the Mediterranean Sea adjoining the southwest coast of Italy, and extending to Corsica, Sardinia, and Sicily.

Tyrtæus (tir-tē′us), a Greek lyric poet of the seventh century B.C., a native of Attica, celebrated for his war songs written for the Spartans.

Tyrwhitt (ter′it), THOMAS, born in London in 1730; died in 1786. He was educated at Eton and at Queen's College, Oxford; became a fellow of Merton; clerk to the House of Commons (1761–67); and in 1784 was appointed a curator of the British Museum. Among his writings were: *Observations on some Passages of Shakespere* (1766); an edition of *Chaucer* (1775); and an edition of the so-called *Rowley's Poems*, in the appendix of which he exposes the fraud of Chatterton.

Tyssens (tī′sens), PETER, a distinguished Flemish painter, born at Antwerp in 1625; died in 1692. He excelled both in portraits and historical painting. Among the latter is *The Assumption of the Virgin.*— His sons, NICHOLAS and AUGUSTINE, were also talented artists, the former painting birds and flowers, the latter landscapes of great merit.

Tytler, PATRICK FRASER, fourth son of Alexander Fraser Tytler (Lord Woodhouselee), was born at Edinburgh in 1791, and died in 1849. He was educated at the University of Edinburgh, became a lawyer, and finally engaged in literature, writing his chief work, the *History of Scotland*, 1823–43. Among his other works are his biographies of the Admirable Crichton, Wicklyff, and Sir Walter Raleigh.— His father, ALEXANDER FRASER TYTLER (Lord Woodhouselee), Scotch judge, was born at Edinburgh in 1747; died in 1813. His chief work is the *Elements of General History.* He also contributed papers to *The Mirror*, *The Lounger*, etc.— Lord Woodhouselee's father, WILLIAM TYTLER, of Woodhouselee, born in 1711; died in 1792, published an *Inquiry into the Evidence Against Mary Queen of Scots*, *Criticisms of Hume's and Robertson's Histories*, the *Poetical Remains of James the First*, etc.

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U

U, the twenty-first letter and the fifth vowel in the English alphabet. Its true primary sound was that which it still retains in most of the languages in Europe, that of *oo* in *cool, tool, good, wood,* etc., answering to the French *ou* in *tour,* the sound being sometimes short, sometimes long.

Ubangi. See *Mobangi.*

Ubeda (ö-bā'da), a city of Spain, province of Jaen, on the right bank of the Guadalquivir. It contains a fine cathedral. Pop. 19,913.

Uberweg (ü'bĕr-vāĥ), FRIEDRICH, born in Rhenish Prussia in 1826; died in 1871. He studied at Göttingen and Berlin, and in 1862 was appointed professor of philosophy at Königsberg. He wrote *A System and History of Logic* (1875) and *A History of Philosophy,* both translated into English.

Ubes, ST. See *Setubal.*

Ucayale (ö-ka-gä'lē), or UCAYA'LI, a large river of Peru, one of the headwaters of the Amazon. It begins in the Apurimac, is upwards of 1000 miles in length, and is navigable by large vessels for 100 miles.

Udaipur (ö'dē-pur), or OODEYPORE, a town in the northwest of India, capital of a native state of the same name in Rajputana, on a lake 2000 feet above sea-level, contains a notable royal palace, and exports turmeric, cotton, indigo, etc. Pop. 45,595.— The state, which has an area of 12,670 sq. miles, came under the protection of Britain in 1817, and the rajah ranks highest in dignity among the Rajput chiefs. Pop. 1,030,212.

Udal. See *Odal Right,* and *Allodium.*

Udall (ū'dal), NICHOLAS, the author of *Ralph Roister Doister,* the first regular English comedy, born in 1506; died in 1556. He was master of Eton School from 1534 to 1541, and the play was written for performance by the scholars. Its authorship was not ascertained till 1818. He was in favor at court as a writer of pageants and interludes.

Uddevalla (ud-e-vâl'lâ), a seaport in the southwest of Sweden, at the inner end of the Byfjord. It has an active trade and textile manufactures. Pop. 9442.

Udine (ö'dē-nā), a walled town of North Italy, capital of a province of the same name and see of an archbishop, 60 miles northeast of Venice. It contains a castle (now a barrack), a Romanesque cathedral, bishop's palace, etc., and has manufactures of linen, silk, woolens, etc. Pop. (1914) 48,952.

Ufa (ö'fâ), a government of Russia, separated in 1865 from Orenburg; area 47,094 square miles. On the east, where it is bordered by the Southern Urals, the country is mountainous, wooded, provided with excellent pastures, and rich in minerals. It is also well watered by the Bielaya, and has abundance of arable land on which good crops are raised. Pop. 2,620,600.—UFA, the capital, stands on the Bielaya, at the confluence of the Ufa, 735 miles east by north of Moscow. It is the see of a bishop, and has considerable manufactures and trade. Pop (1910) 103,485.

Uffizi Gallery (öf-fēd'zē). See *Florence.*

Uganda (ö-gän'dä), a country of British East Africa, to the N. W. of the Victoria Nyanza. It is a rich agricultural country with a mild and uniform climate, and the inhabitants are of a comparatively high type. Within it, wholly or in part, are the large lakes Victoria, Albert, Albert Edward, Kiogo and Rudolf. It was first visited by Speke and Grant in 1860, and is the seat of several mission stations. Under King Mtesa, however, and his successor Mwanga, the Christians were persecuted, and Bishop Hannington was put to death by the latter. It is now a British protectorate, the British seat of administration being Entebbe, the native capital Mengo. Pop. estimated at 4,000,000.

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Ugrians (ö'gri-ânz), a term applied to the Finnic group of Turanian peoples, comprising the Lapps, Finns, and Magyars or Hungarians; their language is termed Ugrian.

Uhland (ö'lant), JOHANN LUDWIG, poet, born at Tübingen in 1787; died in 1862.

Uhl, EDWIN FULLER, statesman, born at Rush, New York, in 1841; died in 1901. He studied law, became mayor of Grand Rapids, Mich., in 1890, and was made assistant Secretary of State in October, 1893; and during the sickness of Secretary Gresham was Acting Secretary of State. While in this office he was entrusted with the arbitration to settle the boundary between Brazil and the Argentine Republic. He was made ambassador to Germany in February, 1896.

Uhlans (ö'lanz), a species of light cavalry in the armies of the Austrians, Russians and Germans.

Uhrichsville (yū'riks-vil), a city of Tuscarawas Co., Ohio, on Stillwater Creek, 9 miles S. E. of New Philadelphia. It has manufactures of fire clay and sewer pipe. Pop. 4751.

Uintah Mountains (ū-in'tȧ), or UINTA, a range of lofty mountains in Utah, which extend E. from the Wahsatch range, and occupy a large area. Some of the peaks reach an altitude of over 13,000 feet.

Uist (wist), two islands of the Outer Hebrides, named North and South Uist. The people are principally engaged in fishing. Pop. about 9000.

Uitlanders (weet'lan-derz), outlanders or foreigners, the name given by the Boers of the Transvaal to the whites who lived in that country before its annexation to the British empire.

Ujjain (ö-jān'), a town of India, in Scindia's dominion, 350 miles northwest of Bombay, surrounded by a stone wall with round towers. It was one of the seven ancient holy cities of the Hindus. Pop. 39,892.

Ukraine (ū'krān), a region in the south of Russia along the northern shore of the Black Sea; called also Little Russia, to distinguish it from White Russia lying further north along the border of Austria-Hungary, and Great Russia, which centers around Moscow and Petrograd. It formed the Russian governments of Kief, Chernigof, Podolsk, Karkof and Poltava. When Nicholas II was deposed and the communal system of government was inaugurated under the leadership of Lenine (*q. v.*), the Ukraine peoples declared themselves independent of Russia and signed a separate peace with Germany in 1918. Pop. about 30,000,000.

Ulans (ū'lanz). See *Uhlans.*

Ulcer (ul'ser), a sore in any of the soft parts of the body, either open to the surface or to some natural cavity, and attended with a secretion of pus or some kind of discharge. Ulcers are of various kinds, as *scorbutic, cancerous, scrofulous,* etc.

Uleåborg (ö'le-o-borg), a town of Russia, in the Grand-duchy of Finland, at the mouth of the Uleå, in the gulf of Bothnia. Pop. (1904) 17,737.

Ulemas (ū-lē'maz), the hierarchical corporation of learned men in Turkey, composed of the Imams or ministers of religion, the Muftis or doctors of law, and the Cadis or administrators of justice.

Ulfilas (ul'fi-las), ULPHILAS, or WULFILAS, a bishop of the Goths of Mœsia, was born, it is supposed, in 311; consecrated bishop by Eusebius of Nicomedia, probably at Antioch, in 341; died at Constantinople in 381. He translated most of the Bible into Gothic (Mœso-Gothic), employing the Greek of the Septuagint for the Old Testament, and a Greek text, different from the received text, for the New. Only some fragments of this translation have been preserved, including the greater part of the four gospels, and these are of the highest linguistic value. See *Goths.*

Ullswater (ūlz'wą-ter), the largest, after Windermere, of the English lakes, 8 miles N. of Windermere; length, 7½ miles. It is noted for its picturesque scenery.

Ulm (ųlm), a strongly fortified town of Würtemberg, 45 miles S. S. E. of Stuttgart, on the left bank of the Danube, on both sides of which there are important fortifications. It is an old town, irregularly built, with narrow winding streets, and has a cathedral in the old Gothic style, one of the largest churches in Germany with the tallest spire in the world (530 feet — completed in 1890). Its manufactures include machinery, woolen and linen cloth, leather, paper, brassware, etc. The capitulation of Ulm in 1805, when General Mack surrendered to Napoleon, was the turning-point of the campaign in Austerlitz. Pop. 56,109.

Ulmaceæ (ul-mā'se-ē), a nat. order of exogens, of which the genus *Ulmus* or elm is the type It is nearly related to Urticaceæ (the nettles), from which it differs only in having a two-celled fruit and hermaphrodite flowers. It consists of trees and shrubs,

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which have scabrous, alternate, simple, deciduous leares and fugacious stipules.

Ulna. See *Arm.*

Ulphilas. See *Ulfilas.*

Ulrici (ụl-rē'tsĕ), HERMANN, a German philosopher, born in 1806; died in 1884. Having studied at Halle and Berlin, in 1834 he was appointed professor of philosophy at Halle University. His principal works are: *A History of Greek Poetry* (1835), *Shakespere's Dramatic Art* (1839), *The Fundamental Principle of Philosophy* (1845-46), *Compendium of Logic* (1860), *God and Nature* (1862), *Body and Soul* (1866), *Elements of Practical Philosophy* (1873).

Ulster (ul'ster), the most northerly of the four provinces of Ireland, 8613 sq. miles in area. It is mountainous in part, the heights reaching 2800 feet. The coast is bold and rocky. In the north is the famous Giant's Causeway. This province is the chief seat of the Irish linen manufacture, and shipbuilding is actively carried on at Belfast. Pop. 1,581,350.

Ulster King of Arms, the principal herald of Ireland, and of the order of St. Patrick. This office was created in 1552.

Ultima Thule (Uppermost Thule), a name given in ancient times by the inhabitants of Southern Europe to the remote regions of the unknown North. The Greek navigator Pytheas (who probably lived in the latter part of the fourth century B.C.) made a voyage along the coast of Britain and wrote an account of what he learned about the Shetland and Orkney Islands and possibly the N. mainland calling the region Thule. The name became vague in its application, especially under the form Ultima Thule. Norway, Ireland, etc., bore the title in turn; and many strange superstitions were current regarding the region.

Ultimatum (ul-ti-mā'tum), any final proposal or statement of conditions; especially, in diplomatic negotiations, the final terms of the one party, the rejection of which often involves an immediate rupture of diplomatic relations and a declaration of war.

Ultramarine (ul-tra-ma-rēn'), a beautiful and durable sky-blue pigment, a color formed of the mineral called lapis lazuli. This substance is much valued by painters, on account of the beauty and permanence of its color, both for oil and water painting. Artificial ultramarine is prepared by heating sulphide of sodium with a mixture of silicic acid and alumina.

Ultramontanism (ul-tra-mon'tānizm), the views of that party in the Church of Rome who place an absolute authority in matters of faith and discipline in the hands of the pope, in opposition to the views of the party who would place the national churches, such as the Gallican, in partial independence of the Roman curia, and make the pope subordinate to the statutes of an œcumenical council. According to ultramontanism the pope is superior to general councils, independent of their decrees, and considered to be the source of all jurisdiction in the church. The Vatican Council of 1870 virtually established the views of ultramontanism as dogmas of the church.

Ulugh Beg, Olug Beg (o'lög-beg), an eminent Moslem astronomer, born in 1394, grandson of Tamerlane, and king of Transoxiana. He began to reign in 1446 and was killed by his son in 1459.

Ulverston (ül'ver-stun, locally pronounced ös'tun), a seaport of England, in Lancashire, about 1½ mile from Morecambe Bay, to which there is a canal. It has a paper-mill, shoe-factory, blast-furnaces, etc., and there is a small amount of shipping. Pop. (1911) 9552.

Ulysses (ū-lis'sēz; in Greek, *Odysseus*), king of the island of Ithaca, was one of the Greek heroes who engaged in the war against Troy. In returning to his own country after the siege he visited the country of the Lotophagi in N. Africa, the Cyclopes in Sicily (see *Polyphemus*), the island of Æolus, king of the winds, reached the island Æœa, where Circe changed (temporarily) his companions into pigs; visited the infernal regions, where he consulted the soothsayer Tiresias how to return to his country; passed in safety the coast of the Sirens, and the dangers of Scylla and Charybdis; remained for seven years with the nymph Calypso after losing all his men; and at last, after an absence of twenty years, returned to Ithaca. Here he found his palace occupied and his substance wasted by suitors for the hand of his wife Penelope, but with the aid of his son Telemachus he put them to death. He lived about sixteen years after his return. These adventures of Ulysses are the subject of Homer's *Odyssey.*

Umballa. See *Ambala.*

Umbel (um'bel), in botany, a variety of inflorescence which consists

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of a number of pedicels or flower-stalks, nearly equal in length, springing from a common center, with the blossoms on their summits forming a level or rounded

Umbels of Hemlock.

surface. When a number of such umbels are combined in the same way we have a *compound umbel*, the smaller umbels being called *partial umbels*.

Umbelliferæ (um-bel-if'er-ē), an extensive and important nat. order of plants, the flowers of which are almost always in regular compound umbels. The plants of this order are natives chiefly of the northern parts of the northern hemisphere, and nearly all herbs with fistular furrowed stems and divided leaves; the fruit consists of two indehiscent ridged carpels united by a commissure. Some are very poisonous, as hemlock and certain others; others are esculents, as celery, carrots, and parsnips; many yield aromatics, as caraway, coriander, dill, anise; a few secrete a fœtid gum-resin, much used in medicine, as asafetida, galbanum, opopanax and sagapenum.

Umber (um'bėr), a well-known mineral pigment, of an olive-brown color in its raw state, but much redder when burnt. It occurs either naturally in veins and beds, or is prepared artificially from various admixtures. The commercial varieties are known as Turkey umber, raw and burnt, and English umber, the latter being an artificial ochrey admixture.

Umbilicus (um-bil'i-kus). See *Navel* and *Placenta*.

Umbra (um'bra), in astronomy, a term applied to the total shadow of the earth or moon in an eclipse, or to the dark cone projected from a planet or satellite on the side opposite to the sun. See *Penumbra*, *Eclipse*.

Umbrella (um-brel'la), a portable shade, screen, or canopy which opens and folds, carried in the hand for sheltering the person. The umbrella had its origin in the East in very remote times, where it was (and still is) regarded as an emblem of royalty or a mark of distinction; but as a defense from the rain it was not used in the West till early in the eighteenth century.

Umbrella-bird, a South American bird (*Cephaloptĕrus ornātus*) allied to the crows, remarkable for the crest of blue-black feathers rising from the head and curving towards the end of the beak, which it nearly reaches. Another long tuft of feathers hangs down from the breast.

Umbrella-tree, a name given to two species of *Magnolia*, *M. umbrella* and *M. tripetala*, from the form and position of the leaves. The same name is given to *Pandānus odoratissimus*, the screw-pine.

Umbria (um'bri-a), a division of Italy, on the Adriatic, which derives its appellation from the Umbrians, by whom it was inhabited in ancient times. It now forms the province of Perugia. The Umbrians were an ancient people who spoke a language akin to the Latin. See *Eugubine Tables*.

Umlaut (öm'lout), in philology, the change of a vowel in one syllable through the influence of one of the vowels *a*, *i*, *u* in the syllable immediately following — a common feature in several of the Teutonic tongues.

Umpire (um'pīr), a person to whose sole decision a matter in dispute between two parties is referred. Specifically, in law, a third person to whom the dispute is referred for decision when, in an arbitration, the arbitrators do not agree.

Umritsir. See *Amritsir*.

Unalaska (ö-nä-läs'kà), one of the largest of the Aleutian Islands (which see), being 75 miles long, and 20 miles at its extreme breadth. On it there are a number of volcanoes.

Unau (ö'nạ), a species of sloth. See *Sloth*.

Uncaria (un-kā'ri-a), a genus of plants. See *Gambir*.

Uncial Letters (un'shal), letters of a large size, used in ancient Latin and Greek manuscripts. These letters were compounded between the majuscule or capital and minuscule or small character, some of the letters resembling the former, others the latter. Uncial writing is supposed to have been

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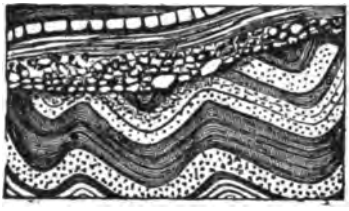
employed in Latin MSS. as early as the third or fourth century, but was seldom used after the tenth.

Uncle Sam, the familiar name of the United States government, used as John Bull is with respect to England. It is an extension of the letters U. S. (United States), printed or stamped on the government property. It was first used in Troy, New York, in 1812, when certain goods purchased for the government and branded U. S., were officially inspected by Samuel Wilson, whose local nickname was Uncle Sam. The coincidence of initials suggested the application of the nickname in full to the government.

Unconformable (un-ka-for'ma-bl), in geology, a term applied to strata whose planes do not lie parallel with those of the subjacent



Unconformable Strata.

or superjacent strata but have a different line of direction or inclination. See also *Conformable.*

Unction, EXTREME. See *Extreme Unction.*

Underground Railroad, the name given before the Civil war to a secret arrangement for helping slaves to escape from the South, by passing them from one hiding place to another until they reached Canada or other places of safety. Large numbers gained their freedom in this way, through the aid of antislavery sympathizers.

Undershot-wheel, a form of water-wheel having a number of float-boards disposed on its circumference, and turned round by the moving force of a stream of water acting on the float-boards at its lowest part. In this wheel the water acts entirely by its momentum, its weight taking no part in the effect.

Underwood, FRANCIS HENRY, author, born at Enfield, Massachusetts, in 1825; died in 1894. He wrote *Handbook of American Literature, Handbook of English Literature,* and some novels and biographies.

Underwood, LUCIEN MARCUS, botanist, born at New Woodstock, New York, in 1853. He became professor of geology and botany in the Illinois Wesleyan University, and wrote *Our Native Ferns and How to Study Them,* and other botanical works.

Underwriter, the name given to individual marine insurers. These persons were formerly not permitted to enter into any joint-stock action as a company, but *wrote under* policies of insurance with the sums for which they severally bound themselves. The system still prevails abroad, but there are also numerous companies whose business it is to grant marine insurances. The underwriters of American cities do not confine their business to marine insurance alone.

Undine (un'dīn), a water-spirit of the female sex, resembling in character the sylphs or spirits of the air, and corresponding somewhat to the naiads of classical mythology. According to Paracelsus, when an undine married a mortal and bore a child she received a soul. One of these spirits is the heroine of a celebrated romance by De la Motte Fouqué.

Undulatory Theory (un'dū-lā-tu-ri), in physics, the theory which regards light as a mode of motion generated by molecular vibrations in the luminous source, and propagated by undulations in the subtle medium known as the ether, presumed to pervade all space and to occupy the intervals which separate the molecules or atoms of bodies. When these undulations reach and act on the nerves of our retina they produce in us the sensation of light. The only other theory of light which can be opposed to this, and which is variously called the *corpuscular, emission,* or *material theory,* supposes light to consist of material particles, emitted from the source, and projected in straight lines in all directions with a velocity which continues uniform at all distances, and is the same for all intensities. The undulatory theory is, however, now universally adopted by physicists.

Ungulata (ung-gū-lā'ta), the ungulate or hoofed quadrupeds, forming the largest and most important order of the mammalia. This order is subdivided into (*a*) the section Perissodactyla, or odd-toed ungulates, which includes the rhinoceros, the tapirs, the horse and all its allies; and (*b*) the Artiodactyla, or even-toed, which comprises the hippotamus, the pigs, and the whole group of ruminants, including

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oxen, sheep, goats, antelopes, camels, deer, etc. In the former section the hind feet are odd-toed (one or three toes) in all the members, and the fore-feet in all except the tapirs; in the latter section the toes are always even in number, either two or four.

Unicorn (ū'ni-korn), a fabulous animal represented as with one horn growing from its forehead. Such an animal is frequently mentioned by Greek and Roman writers, who generally describe it as a native of India, of the size and form of a horse, the body being white, and a straight horn growing from its forehead. The *reem* of the Hebrews, of which *unicorn* is a mistranslation (Deut. xxxiii, 17, and elsewhere), was probably a urus. It was a two-horned animal. The unicorn is one of the supporters of the royal arms of Great Britain, in that posture termed *salient*. It was taken from the arms of Scotland, which had two unicorns as supporters.

Unicorn-root, a popular name of the plant *Aletris farinosa*, a native of North America, which furnishes one of the most intense bitters known, used as a tonic and stomachic.

Uniform (ū'ni-form), the distinguishing dress of any body of soldiers, sailors, members of a society or club, etc. Military uniforms seem first to have been adopted in England about the time of Henry VIII, being used for his body-guard and that of succeeding monarchs. Uniforms for the army came in use in 1661, when, on the restoration of the Stuarts, a standing army was first formed. Scarlet became the national color of the British uniform, as blue did of that of the French and German, though the color varied with circumstances, white being used in hot climates. Blue was adopted in the United States, and during the Civil war blue and gray were the distinctive colors worn by the soldiers of the North and South respectively. The head-dress forms a distinctive part of the uniform, and very showy hats and helmets are at times worn, but chiefly for parade purposes. In recent times, owing to the advent of smokeless powder and long range rifles with telescopic sights, showy uniforms of any kind and color have grown dangerous, and there is a growing tendency to adopt the khaki, dust-colored wear, from its indistinctness when at a distance. The idea of display in military dress is being abandoned in favor of that of safety.

Uniformity, Act of. See *Act of Uniformity*.

Unigenitus dei filius ('only begotten son of God'; from the initial words), a bull of Pope Clement XI (1713).

Union (ūn'yun), a town of Hudson Co., New Jersey, opposite New York, one mile N. of Hoboken. It has silk and other industries. Pop. 21,023.

Union, a town of Union Co., South Carolina, 70 miles N. N. W. of Columbia. It has cotton, cotton-seed-oil, and hosiery mills. Pop. 5623.

Union, The, in English history, the uniting of the parliaments of Scotland and England by the Act of Union, 1707; also, the legislative union of Ireland with Great Britain in 1800. —*The Union* is a term frequently applied to the United States of America.

Union Fabrics, are textile fabrics made of a mixture of different materials, as cotton and wool, cotton and silk, and similar mixtures, in which flax, hemp, jute, etc., are mixed with other fibrous materials.

Union Jack, the national ensign of Britain used in small form as a jack—that is, displayed at the end of a bowsprit. The name has come (wrongly) to be applied to the union flag itself. It is formed by the union of the crosses of St. George, St. Andrew and St. Patrick. The jack is not flown on shore.

Union of South Africa, a federation of four British colonies of South Africa, including those of the Cape of Good Hope, Natal, Transvaal, and Orange Free State, dating from May 31, 1910. The movement for the union of the South African colonies was launched by a convention in 1908. This convention reassembled in January, 1909, and proceeded to draft a constitution which, after revision, was adopted. This constitution vests the executive power in the British kings and his representative; the legislative in a Senate and House of Assembly. A Supreme Court is also provided for, of which the several supreme courts of the colonies are to form part. This consists of judges elected by each of the four States. The Senate consists of 40 members, 8 appointed by the governor-general and 8 elected by each of the four states. The House has 121 members, divided among the States according to their respective importance; the Cape colony having 51, Natal 17, Transvaal 36, and Orange Free State 17. The federation was confirmed by Parliament, August 16, 1909. Herbert John Gladstone was appointed as the first governor-general, General Louis Botha, of the late Boer army, being made premier. Each colony

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retained its own governor and legislature. The area of this new federal union is 472,897 sq. miles, the pop. 5,450,217.

Union Theological Seminary, a divinity school in New York City, Presbyterian in origin but now independent of ecclesiastical control. It offers courses leading to the degrees of bachelor of divinity and doctor of divinity. The seminary buildings are on Broadway at 120th Street. There are 130,000 volumes in the library. In 1917 there were 30 instructors and 230 students.

Uniontown, capital of Fayette Co., Pennsylvania, 44 miles S. by E. of Pittsburgh. It is in an iron, and coal district, and has coke, iron, steel, glass, and other industries. Pop. 13,344.

Unit (ū'nit), in arithmetic, the least whole number, or one, represented by the figure 1. Every other number is an assemblage of units. This definition is applicable to fractions as well as to whole numbers. In mathematics and physics a unit is any known determinate quantity by the constant repetition of which any other quantity of the same kind is measured. It is not itself *one*, but is a length, or a surface, or a solid, or a weight, or a time, as the case may be, while 1 is only a numerical symbol. —*Specific gravity unit:* for solids or liquids, 1 cubic foot of distilled water at 62° Fahr.= 1; for air and gases, 1 cubic foot of atmospheric air at 62° Fahr.= 1. The *unit of heat*, or *thermal unit*, in the United States and Britain, the quantity of heat which corresponds to 1° Fahr. in the temperature of 1 lb. of pure water at about 39° Fahr.; in France, the heat required to raise a gramme of pure water at about 3.94° C., 1° C.— In electricity the *unit of quantity* is that quantity of electricity which with an electro-motive force of one volt will flow through a resistance of 1,000,000 ohms in one second, called a *farad; unit of current*, a current of one farad per second; *unit of work*, that which will produce a velocity of one meter (39.37 inches) per second in a mass weighing one gramme (15.432 grains) after acting upon it a second of time.— A *dynamic unit* is one expressing the quantity of a force or the amount of work done. One such unit is the *foot-pound* (which see). The system of units recommended by a committee of the British Association for scientific calculations, and known as the *C.G.S. system*, adopts the *centimeter* as the unit of length, the *gramme* as the unit of mass, and the *second* as the unit of time, these words being represented respectively by the above letters. (See *Dynamics.*) In this system the *unit of area* is the square centimeter, the *unit of volume* is the cubic centimeter, and the *unit of velocity* is a velocity of a centimeter per second. The *unit of momentum* is the momentum of a gram moving with a velocity of a centimeter per second.

Unitarian (ū-ni-tā'ri-an), a religious sect or congeries of sects, distinguished by the denial of the received doctrine of the Trinity. The Unitarians may be divided into classes: (1) The conservative or orthodox Unitarians, who accept the general articles of the Christian creed (with the exception of the Trinity), such as miracles, the resurrection of Christ, and the plenary inspiration of Scripture. (2) The liberal or progressive Unitarians, whose creed is purely rationalistic. They consider Christ as a mere man, inspired as other great men are, though in a greater degree; they reject the doctrines of original sin, eternal punishment, the belief in miracles, and generally the whole supernatural element in Christianity. They deny the necessity of an atonement, considering Christ's death but as a martyrdom in defense of truth. This latter class forms the majority. Unitarian views have been held more or less in all ages of the church, but they came more prominently forward during the Reformation period, especially in connection with the teaching of the elder and younger Socinus, Lælius and Faustus, uncle and nephew.

United Brethren in Christ, an American religious sect, founded by Philip William Otterbein, a minister of the German Reformed Church, and Martin Boehm, a Pennsylvania Mennonite. The church was organized in 1800; it was at first confined to a membership that was largely German, but it widened its scope and grew rapidly. There are nearly 3600 churches, with about 346,000 members and 2000 ministers. Ten colleges and several academics are supported by the church. Bonebrake Theological Seminary, Dayton, Ohio, dates from 1871. The church has an extensive publishing house at Dayton. The theology of the United Brethren in Christ is Arminian. They have two sacraments: baptism and the Lord's Supper. The ceremony of the washing of feet is sometimes used. Home, Foreign Mission and other societies are supported. At the time of the revision of the Confession of Faith in 1889, the conservative element withdrew and established the '*Old Constitution*' body, which

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now has an estimated membership of about 22,000.

United Greeks are Christians who originally belonged to the Greek Church, but whom the Roman Church has united with her own members on certain conditions. They retain the ancient rite, the Greek language during service, the strict Greek fasts, and the Lord's supper under both forms, in common with the old Greek Church.

United Kingdom. See *Britain*.

United Presbyterian Church, the name adopted by that Scottish church which was formed by the union of the Secession Church and the Relief Church in May, 1847. This church adheres to the theological doctrines taught in the Westminster Confession of Faith and the Larger and Shorter Catechisms. The system of church government differs from that of the Established and Free churches only in having no intermediate court between the presbyteries and the supreme court, the latter of which is called a General Synod, and sits once a year. In the United States there are about 1000 churches and over 150,000 members.

United States (officially *The United States of America*), a federal republic of North America, one of the largest and most important countries of the world, which occupies nearly one-half the total area of the continent and extends from the Atlantic to the Pacific oceans, and from the Mexican republic and Gulf of Mexico on the south to the Dominion of Canada on the north. Its greatest length, from east to west, is 2800 miles; greatest breadth, north to south, 1600 miles; area, 3,026,789 square miles, equal to more than three-fourths that of all Europe. In addition it possesses the isolated territory of Alaska, 590,884 square miles in area, making its total extent nearly equal to that of Europe. Recent additions to its territory comprise the Philippine and Hawaiian islands, in the Pacific, and the island of Porto Rico in the Atlantic, with a few smaller islands, adding a further area of 132,310 square miles, the total area under the American flag being 3,749,983 square miles. The boundaries on east and west are the Atlantic and Pacific oceans, on the south the waters of the Gulf of Mexico and the northern border line of Mexico. On the north the boundary west of the 95th meridian of W. longitude is, with slight exception, the 49th parallel of N. latitude. East of this meridian it is irregular, following the median line of the great lakes and the St. Lawrence River, which it leaves at the 45th parallel of latitude. This parallel forms the northern boundary of New York and Vermont, but Maine projects northward nearly to the parallel of 47° 30′. The population of this country, exclusive of its outlying portions, was in 1910, 91,972,266; inclusive of Alaska, Hawaii, and Porto Rico, 93,402,151. That of the Philippine Islands (census of 1903) was 7,635,426, making a total under the dominion of the great republic of over 100,000,000. This includes a negro population of nearly 10,000,000, and a foreign-born population of over 13,000,000, exclusive of that in the island possessions. The federation consists of 48 states (13 originally); 2 organized territories, Hawaii and Alaska; 1 unorganized, Porto Rico; and the dependencies of the Philippine, Guam and Tutuila islands. There are three cities of over 1,000,000, eight of over 500,000 population, these being New York, 4,766,883; Chicago, 2,185,283; Philadelphia, 1,549,008; St. Louis, 687,029; Boston, 670,585; Cleveland, 560,663; Baltimore, 558,485, and Pittsburgh, 533,905. The cities of over 100,000 number fifty-one. The table on the following page gives the areas and populations of the States and Territories, those marked * being the original States.

Physical Characteristics.— The United States is very diversified in physical aspect, soil and climate, extending, as it does, from 25° to 49° N. latitude, and from east to west over lowlands, plains, plateaus and mountain ranges. It has two broadly marked features, the Mississippi River, with its great valley, crossing it from north to south, and the wide elevation of the Rocky Mountains, with its bordering plains and plateaus, following the same direction farther west. The Mississippi Valley, covering about one-half the area of the United States, comprises in its northern portion a prairie region, largely treeless, in parts quite level, but generally a rolling country. South of the Missouri and the Ohio its surface is more varied, there being numerous hilly tracts, while the level reaches are often swampy near the rivers. Forests formerly covered this southern region somewhat generally, and considerable tracts of woodland remain, but farming and grazing lands now occupy in great part the ancient forest area.

Passing eastward from this vast valley, with its elevation varying from 700 feet

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States.	Area in Sq. Miles.	Population, 1900.	Population, 1910.
Alabama	51,998	1,828,697	2,138,093
Arkansas	53,335	1,311,564	1,574,449
Arizona	113,956	122,931	204,354
California	158,297	1,485,053	2,377,549
Colorado	103,948	539,700	799,024
*Connecticut	4,965	908,355	1,114,756
*Delaware	2,370	184,735	202,322
Florida	58,666	528,542	751,139
*Georgia	59,265	2,216,331	2,609,121
Idaho	83,888	161,772	325,594
Illinois	56,665	4,821,550	5,638,591
Indiana	36,354	2,516,462	2,700,876
Iowa	56,147	2,231,853	2,224,721
Kansas	82,158	1,470,495	1,690,949
Kentucky	40,598	2,147,174	2,289,905
Louisiana	48,506	1,381,625	1,656,388
Maine	33,040	694,466	742,371
*Maryland	12,327	1,190,050	1,295,346
*Massachusetts	8,266	2,805,346	3,366,416
Michigan	57,980	2,420,982	2,810,173
Minnesota	84,682	1,751,394	2,075,708
Mississippi	46,865	1,551,270	1,797,114
Missouri	69,420	3,106,665	3,293,335
Montana	146,997	243,329	376,053
Nebraska	77,520	1,068,539	1,192,214
Nevada	110,690	42,335	81,875
*New Hampshire	9,341	411,588	430,572
*New Jersey	8,224	1,883,669	2,537,167
New Mexico	122,634	195,310	327,301
*New York	49,204	7,268,012	9,113,279
*North Carolina	52,426	1,893,810	2,206,287
North Dakota	70,837	319,146	577,056
Ohio	41,040	4,157,545	4,767,121
Oklahoma	70,057	1,000,000	1,657,155
Oregon	96,699	413,536	672,765
*Pennsylvania	45,126	6,302,115	7,665,111
*Rhode Island	1,248	428,556	542,610
*South Carolina	30,989	1,340,316	1,515,400
South Dakota	77,615	401,570	583,888
Tennessee	42,022	2,020,616	2,184,789
Texas	265,896	3,048,710	3,896,542
Utah	84,990	276,749	373,351
Vermont	9,564	343,641	355,956
*Virginia	42,627	1,854,184	2,061,612
Washington	69,127	518,103	1,141,990
West Virginia	24,170	958,800	1,221,119
Wisconsin	56,066	2,069,042	2,333,860
Wyoming	97,914	92,531	145,965
Territories and Districts.			
D. of Columbia	70	278,718	331,069
Alaska	590,884	63,441	64,356
Hawaii	6,449	154,001	191,909
Porto Rico	3,606	953,243	1,118,012

at the head of navigation to sea level in the coast district, an elevated region is reached, the Appalachian uplift, which borders the great valley on the east, as the Rocky Mountain region does on the west. Those mountains extend from northern New England to central Georgia and Alabama, reaching an elevation of 6293 feet in Mount Washington, N. H., and 6710 in Mount Mitchell, N. C. (See *Appalachian Mountains.*) From the eastern base of this mountain system to the sea extends a coast plain, narrow in Maine, but widening southward, with the exception of a narrow belt at New York, and finally attaining a width of 200 miles in North Carolina. It is hilly in parts of New England, but below New York presents a distinct coast region and a more elevated slope, the latter southward becoming a somewhat abrupt terrace, rising from a few hundred to more than a thousand feet and known as the 'Piedmont Plateau.' The coastal region is seldom more than 100 feet in height, and has a sandy soil, with extensive swamps in many places near the coast. The coastal plain extends from the Atlantic westward along the Gulf border and in its South Atlantic portion extends far southward, forming the peninsular State of Florida. In this are extensive swamps, which have been partly reclaimed. Proceeding westward from the Mississippi River, the land rises in a very gentle slope until it reaches the base of the western plateau, where elevations of 5000 and 6000 feet are attained. This region, known as the Great Plains, has a light rainfall and is not nearly so well adapted for agriculture as the lower eastward region, but it is covered with nutritive grasses and forms extensive regions of pasturage, the great grazing section of the country. Westward still the foot-hills of the mighty Rocky Mountain system appear. (For the characteristics of the latter see *Rocky Mountains.*) Westward from this region of lofty peaks and arid soil stretches to the ocean the Pacific slope, broken by mountain ranges which embrace the Sierra Nevada and the Coast Range, and including the Great Basin, a vast arid plateau, none of the drainage of which reaches the sea. The Great Salt Lake is its most extensive body of water, the relic of a supposed much more extensive lake of past ages, known to geologists as Lake Bonneville. From these mountains and plateaus the land slopes downward to the Pacific coast. In the northeast Puget Sound, a deep open channel of navigable water, extends far into the State of Washington. In southeast California is another great depression, the Mohave Desert, waterless, but sinking in its deepest part to a depth of 260 feet below sea-level.

A splendid system of drainage exists over the greater part of the broad surface of the republic, especially in its great central agricultural plain, which is crossed by the Mississippi through nearly its whole width, while its great lateral affluents, the

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Missouri and Ohio, with their numerous branches, gather up the greater parts of the waters of the east and west, and farther south the Arkansas, Red, and other streams pour their waters into the great central artery of drainage. Eastward of the Appalachian extend numerous shorter streams, the Connecticut, Hudson, Delaware, Susquehanna, Potomac, James, Roanoke, Savannah and various others. On the Pacific slope the rivers are of lesser size, the mountains diverting much of the waterflow into interior reservoirs, as in the Great Basin, while the lesser rainfall supplies a smaller quantity of water. The Columbia, with the exception of the Yukon, of Alaska, is the largest river of the continent flowing into the Pacific. There are various smaller streams, the most notable being the Colorado, famous from the grand canyon through which it flows. This, however, renders it unserviceable to mankind except in its lowest section, where it is proving of great value as a source of irrigation. A notable feature of the water system of the United States is the series of great lakes which extend between the States and eastern Canada, sending their waters by the channel of the St. Lawrence to the ocean, and forming an interior commercial waterway nowhere rivaled.

Climate.— The great width of the United States from north to south and its diversified topography give it a great variety of climatic conditions, varying from semi-arctic to semi-tropic in temperatures. The icy blasts from the great northwestern level of the continent find their way southward over the wide central plains with little interruption, to the Appalachians, which, in a measure, save the Atlantic States from their Arctic influence. Warm southern winds, entering from the Gulf region, similarly make their way over the valley, bringing summer temperatures, often of tropic heat. This frequent variation of the winds between north and south makes the climate of the east more variable and with greater extremes of temperature than that of the west, where the changes of temperature are much more regular. In the North Atlantic States the temperature frequently falls below zero, and in Minnesota it descends to as low as —40°, but the dryness of the air renders such extremes easily bearable, except when accompanied by strong winds and 'blizzard' snows. In the Middle Atlantic States the temperature at times rises in summer to 100° or even above, but such extremes are rarely of long continuance. In this section the rainfall is abundant, but not excessive, and in the Mississippi valley the rains are sufficient in quantity and regular enough in distribution to aid everywhere in successful agriculture. On the Pacific slope, on the contrary, the rains come periodically, there being wet and dry seasons, while within the Rocky Mountain system the rainfall is in general so deficient that irrigation is necessary to render agriculture remunerative, or even possible, in many sections. On the coast of Washington the annual fall is in places as high as 80 inches, while in the mountain regions it is reduced to 14 inches or even less, and in the California Desert and Death Valley there may be no rain for years at a time. In the arid and semiarid sections of the west, irrigation, long practiced by the people, has been taken in hand by the government, already with the addition of large areas of very productive land to the national resources and the promise of millions of acres of fertile farm lands in the future.

Flora.— The territory of the United States, when settlement first began, was covered in great part with dense forests, a region of flourishing woodland unsurpassed in extent and value. But the needs of settlers led to the removal of vast acres of this woodland for agricultural purposes, and the demands for lumber of an increasing population has added immensely to this destructive process, until what forests remain are largely confined to the mountains and are insufficient to supply the growing demand. The government has recently undertaken to conserve what remain of those forests on the public lands. The existing forests cover 550,000,000 acres or about one-fourth the area of the United States. Much the larger part of this woodland belongs to private owners, but there are very extensive national forests, and nearly 200,000,000 acres of these have been withdrawn from settlement and sale to be kept for the benefit of the whole community and utilized for the preservation of the head-waters of streams. A forest service has been organized for the care of these large national forests and vigorous efforts are being made to prevent the decimating fires which have proven so destructive in the past. The forest region of the country embraces a northern belt of pines, in which the white pine, one of the noblest and most valuable to the wood-worker of American trees, occupies a conspicuous place. It has, however, been very largely removed by wasteful and reckless forestry and the less valu-

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able pines of the South are in a measure taking its place. Other northern trees of considerable industrial value are the spruce, hemlock, yellow cedar, larch, linden, ash, maple, birch and elm. Somewhat farther south range the hickories and oaks, the chestnut, tulip tree, walnut, poplar, plane, beech, catalpa, cherry and other valuable timber trees, some of these extending as far south as the Gulf coast. The flora of the southern coast regions is especially characterized by several species of pine, the live oak, palmetto, cypress and other species. The Appalachian mountains are generally covered with thick forests and the lower Mississippi valley is richly forested. The prairie region of the northern half of this valley, ranging from western Indiana to eastern Dakota, formerly mainly treeless, now contains much woodland, of recent planting, and the great plains east of the Rocky mountains, where the woodland was of old chiefly confined to the banks of streams, is becoming in a measure forested. The vast mountain region of the west is richly covered with woodland, especially on the coast ranges, where grows one of the densest and loftiest forests on the globe. This Pacific region has a characteristic flora of its own, largely composed of coniferous woods and yielding the tallest masts and finest spars to be anywhere obtained. Noblest among these trees in the north is the great Douglas fir, and in the south the splendid redwood of the California coast range and the giant sequoias of the Sierra Nevada, the most stupendous trees of the earth. The minor flora of the country embraces a large variety of fruit trees and berries, with plants of economic value for various purposes. The pines of the south have a utility separate from that of timber purposes, yielding large quantities of tar, turpentine, rosin, and similar products, known collectively as 'naval stores.' In many rural districts the forests supply the principal fuel used. Peat is locally employed as fuel, and in some of the treeless districts hay, straw, and flax are burned for domestic purposes, ingenious inventions having rendered such materials useful for this purpose.

Fauna.— The fauna of the United States, like its flora, is very varied, including many species found in foreign lands, and some which are exclusively American. Among wild animals are the bison or buffalo, now almost extinct in a wild state, the moose or American elk, the caribou, or reindeer, the prong-horned antelope, the big-horn or Rocky Mountain sheep, the so-called Rocky Mountain goat (a goat-like antelope), the wapiti or American stag, the Virginia deer, the peccary, the cougar or puma, the black and grizzly bear, the panther, the prairie wolf, the raccoon and the beaver. Among the birds are swans, wild turkeys, wild geese, wild ducks, eagles, vultures, mocking and humming birds, etc. Among the reptiles are the rattlesnake and other snakes, turtles and tortoises, alligators, etc. The smaller animals include the lynx, weasel, foxes of several species, muskrat, marten, skunk, otter, prairie-dog, opossum, rabbit, porcupine, numerous species of squirrels and gophers, and a large number of destructive animals of the rat and mouse family. Among water animals there is a great variety of fishes, many of them, as the cod, shad, herring, salmon, mackerel, etc., highly esteemed for table use. Chief among shellfish is the oyster, more abundant on the Atlantic coast than anywhere else in the world and unequaled in quality in any other country. Of crustaceans, the lobster comes first, of a species quite distinct from that of Europe. As for domestic animals there are none of American origin, all the animals of field and household having been brought from Europe. It is the same with the poultry yard, with the exception of the turkey and some species of swimming birds.

Minerals.— The mineral resources of the United States are enormous in supply and exceedingly varied in kind, being in some respects beyond rivalry. Very much of this wealth is centered in the Rocky Mountain region and the Pacific coast states, but this does not apply to the highly valuable stores of coal, petroleum, natural gas and iron, which are very largely developed in the Appalachian region and the Middle West. The Appalachian coal fields embrace an area of over 59,000 square miles, including the small but richly productive anthracite region of Pennsylvania. In addition there are about 125,000 square miles in Illinois, Missouri and other Mississippi valley States. Petroleum, at first obtained only in Pennsylvania, has been found abundantly elsewhere, and extends to Texas and the California coast, where it occurs in large quantity. Iron ores abound in many sections, being very rich in Pennsylvania, West Virginia, Tennessee, Alabama, Wisconsin, Minnesota, Missouri and several other States. Copper is unequaled in quantity, the United States supplying over five-eighths of the world's product. Its great fields are in Arizona, Montana, Michigan, Utah and Cali-

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fornia, the ores of Michigan being 90–95 per cent. pure metal. Gold and silver are widely distributed, the United States standing second only to South Africa in its production of gold, and to Mexico in that of silver. The leading States in these metals are California, Colorado, Nevada, and the territory of Alaska, in gold; and Montana, Colorado, Nevada, Utah, Idaho and Arizona in silver. Other metals in which this country is rich are lead and zinc. Tin ore is abundant but in unworkable condition, and there are minor yields of nickel, platinum, mercury, antimony, etc. In the Rocky Mountain region are vast deposits of lignitic coal, hitherto little used, but now becoming available, and of late years exceedingly valuable coal deposits have been found in Alaska, not yet worked. Copper is also abundant in this territory. Aside from the minerals mentioned are many others of economic value, including salt, borax, limestone, marble, sulphur, cement, etc. Geologically the United States possesses examples of all the formations, and is rich alike in fossils of the primary and the later periods. It is especially notable for its abundance of vertebrate remains in the geologic strata ranging from the Permian to the Quaternary, including the gigantic dinosaurs of the Jurassic and Cretaceous epochs, the flying reptiles and toothed birds of the Cretaceous, and the greatly varied mammals of the Tertiary age. Among the latter are several types in the life history of the horse, and in later time the horse itself. There are also giant edentates, allied to the more recent ones of South America; and the mammoth and mastodon, relatives of the elephant, all of which appear to have existed in recent geologic times. These are the more notable among a multitude of fossil forms.

Agriculture.— It is estimated that the arable lands of the United States exceed a million and a quarter square miles in area, of which over 870,000 square miles were occupied as farms in 1910, about 475,000 square miles consisting of improved lands. Considerable additions have been made to this area within the last decade, irrigation in the west having brought under cultivation large areas once deemed hopelessly arid. The basin of the Mississippi, the Pacific coast lands, and the valley of the Red River of the north vie with each other in fertility, and other highly productive lands are those of the Gulf coast, the region draining into the Great Lakes, and much of that east of the Appalachian mountains. Westward, however, is a very extensive section in great part unfit for cultivation except under irrigation on account of deficient rainfall. This comprises most of the region between the eastern foot-hills of the Rocky Mountain system westward to the Sierra Nevada and Cascade ranges, an immense area embracing about one-third of the whole country. It includes the States of Arizona, New Mexico, Nevada, Utah, Wyoming, Montana, most of Colorado, and southern California, a large part of Oregon, Idaho and Texas, and parts of the Dakotas, Nebraska and Kansas. A large part of this great region is grass-covered and yields food to immense herds of cattle and sheep. Much of it also may yet be rendered fertile by irrigation, but there is a great extent of absolute desert to which irrigation cannot be applied.

Of American crops the two distinctive ones are cotton and Indian corn, of each of which the United States produces much more than all the rest of the world combined. Most of the cotton goods of the world are woven from American cotton. The corn, however, is very largely consumed at home, especially for the feeding of live stock, the hog-harvest being largely dependent upon it. Wheat is another product of great importance, the crop of the United States having long been the largest in the world. Russia in Europe is now a close rival, but all other countries are far surpassed. There are also large crops of hay and oats, the five named being the leading crops of the country. Other products of great important are potatoes, tobacco, sugar, and rice. In 1910 the corn crop reached the vast total of over 3,000,000,000 bushels, the wheat crop nearly 700,000,000 bushels, the oat crop 1,100,000,000 bushels, the cotton supply (1911) 12,132,332 bales, the total value of all farm crops increased from $5,000,000,000 in 1900 to about $9,000,000,000 in 1911. Other cereals grown are rye, barley, and buckwheat, and common farm products include sweet potatoes, flax, hops and peanuts, each largely grown. No other part of the world is so rich in fruits, alike in quantity and variety. Very important among these are the apple, peach and pear. Plums, apricots, cherries and grapes are produced abundantly, and a considerable variety of berries and nuts are grown. The grape is an important crop in many parts of the east, and especially so in California, and much wine is made. To the temperate products must be added those of the semitropics, the orange, lemon, olive, fig and almond, abundant in California, and the orange and pineapple of Florida.

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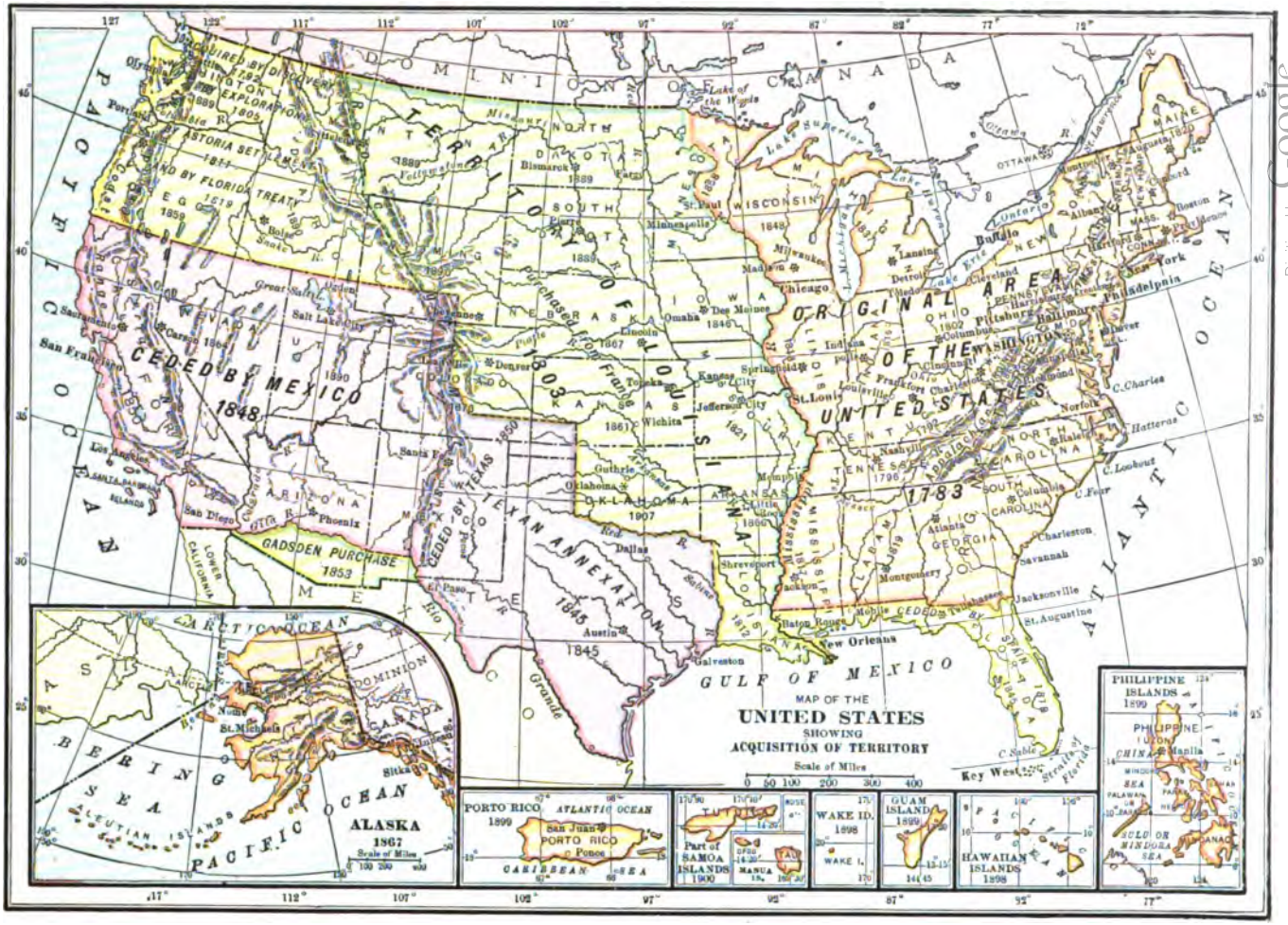

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Live-stock.— The abundant corn and hay crops of the United States and the very extensive grazing grounds of the region of prairies and plains give a great opportunity for the raising of live-stock. The leading cattle-breeding State is Texas; sheep-raising is most extensive on the elevated plains east of the Rocky Mountains and on the Pacific slope; horses and mules are bred in great numbers in Missouri, Kentucky and Tennessee, while hogs are raised in all the corn-growing States of the Central and Southern section. Slaughtering and beef and pork-packing are carried on very extensively in Chicago, and various other cities of the Middle West. The dairying industry of the country is very large and immense quantities of butter and several varieties of cheese are made.

Manufactures.— The United States has become the foremost manufacturing country in the world, its supplies of coal and iron exceeding those of any other quarter of the globe, while the industry, inventive genius and enterprise of the people and the rapid development of facilities for transportation helped to advance the material interests of the country throughout the nineteenth century, and have given unquestioned industrial supremacy in the twentieth. Among the greatly varied manufacturing industries that of textiles stands high, the cotton and woolen manufacture being very flourishing, while in silk manufacture this country is becoming a rival of France. Knit goods are largely produced, while the production of ready-made clothing is a very active industry. Iron and steel production has reached a very high level, surpassing that of any other country, while the manufacture of iron and steel wares is most varied and abundant. Chief among these industries are the production of building steel, iron bridges, railroad iron and steel, locomotives, armor for steel-clad battleships, fire-arms, steel cars and machine-shop products in general. Other great fields of manufacture are those of electrical appliances, automobiles, agricultural implements, tin-plate, leather, boots and shoes, paper (the pulp for which consumes whole forests), pottery, furniture, flour, beet-sugar, beer, lumber-products and many others. As for the smaller industries, they are innumerable. The value of manufactured goods has grown from $5,300,000,000 in 1880 to $20,600,000,000 in 1910.

Commerce and Transportation.— The commerce of the United States has vied with its manufactures in development. Transportation has been provided with extraordinary rapidity. For internal commerce the navigable inland waters of the country have been of immense value, in view of the fact that steam transportation was established upon them early in the history of the republic. Canals were early provided to add to the facilities in this direction, chief among these being the Erie Canal, from Buffalo to Albany, which for the greater part of a century has been a valuable carrier of freight. But railroad development has largely replaced that by water in the inland commerce of the country. This began in 1830 with 23 miles of track. In 1900, seventy years later, it had grown to 194,334 miles. In 1912 it had reached nearly 250,000 miles, far surpassing in length that of any other country, and equaling that of all Europe. The foreign trade of the country has grown to great proportions, though it is much surpassed by the internal commerce. In the last century the great bulk of it consisted of agricultural products and meats, cotton being a leading article of export. Of recent years, however, this country has ceased to feed and clothe Europe to the extent of the past, the home demand having grown so greatly, especially for food stuffs, as to consume the great bulk of them, while several other countries are competing largely in wheat, and to a small extent in cotton. On the other hand the export of manufactured goods has grown until now these form a very considerable part of the goods sent abroad. At the beginning of the twentieth century the commerce of the United States was valued at about $2,500,000,000. In 1911 it reached a total of about $3,500,000,000. Of this much the greater part were exports, the balance of trade in its favor being in 1900 about $500,000,000. It has decreased somewhat since then, but is still a notable amount. About two-thirds of the exports go to Europe, half this amount going to the British Isles. The bulk of the British purchases consists of cotton and food-stuffs. The exports of manufactured goods embrace iron and steel wares, leather, tobacco, oils, agricultural implements, copper manufactures, cotton goods, leather, wood products, etc. The imports include chemicals, cotton goods, fibers, fruits, furs, hides and skins, wool, tin-plate, india rubber, jewelry, silk goods, coffee, sugar, tea, tropical fruits and various other wares.

Government.— The government of the United States is a federal republic based on the constitution of 1787, drawn up by delegates from the thirteen original States, and subsequently amended. The constitution and modes of administration

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of the individual States bear a close resemblance to each other and to the national government. Each State maintains its independence, and by means of a State legislature and executive (vested in a governor) has complete management of its own affairs. The combined States have one supreme legislature, which takes the name of Congress, and consists of a Senate and a House of Representatives. The Senate consists of two members from each State elected by its citizens for six years, one-third of the whole body being renewable biennially. The House of Representatives consists of members chosen for two years by the people of the several States, in numbers proportioned to their population as ascertained by the decennial census. The head of the executive power of the government is a President, elected by the people and holding his office for a term of four years, with a Vice-President elected at the same time and for the same term. Only persons born in the United States and who have reached the age of 35 years are eligible to the presidency. The President is commander-in-chief of the army and navy and of the militia in the service of the Union. He has the power of a veto on all laws passed by Congress; but, notwithstanding his veto, any bill may become a law on its being afterwards passed by each House of Congress by a two-thirds vote. The Vice-President is *ex officio* President of the Senate. The presidential succession is fixed by Chapter 4 of the acts of the 49th Congress, 1st session. In case of the removal, death, resignation, or inability of both the President and Vice-President, then the Secretary of State shall act as President till the disability of the President or Vice-President is removed or a President is elected. If there be no Secretary of State, then the Secretary of the Treasury will act; and the remainder of the order of succession is; Secretary of War, Attorney-General, Postmaster-General, Secretary of the Navy, Secretary of the Interior (the offices of Secretary of Agriculture, Secretary of Commerce, and Secretary of Labor, were created after the passage of the act). By the 15th amendment to the Constitution neither race nor color affects the rights of citizens, though untaxed Indians and Chinese are excluded from the franchise. The same is the case with women except in ten states in which they have full franchise and a number of others in which they have a partial franchise. There is a third section of the government, the judicial, consisting of a Supreme Court, which deals with interstate subjects of controversy and has the power of invalidating the enactments of Congress, if it decides that they are not in conformity with the Constitution. (See succeeding article on *United States, Political Development of the.*) The governments of the States are based on a similar principle, each having its Supreme Court, the decisions of which are final on a constitutional question. The Constitution can be amended only by a vote in favor of the proposed amendment of two-thirds of each House, and subsequently by the acceptance of three-fourths of the States; or by the calling of a constitutional convention on the demand of two-thirds of the States, with ratifying conventions in three-fourths of the States. While each State is guaranteed a republican form of government, and in general their governments are based on the same principle as that of the national government, the territories, organized and unorganized, are under the direct control of Congress, the organized ones being represented in Congress by a delegate, who has no vote, and having legislatures elected by their people.

Finances.— The public debt of the United States reached its ultimate height in 1866, as a result of the expenditure for the Civil war, its amount on July 1 of that year being $2,773,236,173. Thirty years before the country had been out of debt and with an excess of funds which it divided among the several States. After the war the reduction of this debt proceeded with marked rapidity, until by 1912 the interest-bearing debt had decreased to $963,349,390, and the debt bearing no interest to $383,499,246, making a total of $1,346,848,636, including $1,851,810 on which interest had ceased. Against this there was in the treasury a reserve fund and cash balance amounting to $300,400,000. During this period the expenses of the government had steadily increased until what was called a billion dollar Congress was reached in McKinley's first term, while in 1912 the appropriation for a single session of Congress was over $660,000,000.

Army.— The United States army is based on the principle of that of Great Britain, being recruited by voluntary enlistment only, not by conscription and forced military service of all able-bodied men, as is generally the case in the nations of Europe. The island condition of Great Britain and the strength of her navy has removed the necessity of general military duty, while the oceans which divide the United States from all other powerful nations have rendered a powerful army in this country in times of peace

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unnecessary, a strong navy being depended upon for protection. As a result the army has been generally restricted to the numbers requisite for military police duty, the keeping a great multitude of men under arms in times of peace in readiness for possible war being not considered requisite. This policy has always prevailed, no more men being kept in the ranks than are deemed necessary to maintain internal order, the government relying upon the enlistment of volunteers in times of emergency. In 1790 the national army consisted of only 1260 men, under the command of the President. In 1861 its numbers had grown to 14,000. During the Civil war 2,039,748 men were called into the ranks chiefly by voluntary enlistment, in some measure by conscription, or by bounties of from $300 to $1000 to each volunteer. After the war the army was disbanded with the exception of the number required for peace service, and by an act of Congress of July 15, 1870, this number was limited to 30,000 men. This number was subsequently increased during the century to about 60,000. The brief war with Spain, in 1898, demanded a sudden enhancement of the army, which was readily accomplished by a call for volunteers. But the lack of careful supervision of this large body of raw soldiers was seriously felt, bad management resulting in the death of large numbers of them by disease. After the disbandment of this volunteer force the limit of strength of the regular army was fixed by Secretary of War Root and General Miles at 77,284 men, in accordance with General Miles's proposition of one soldier for every thousand inhabitants. The length of service was fixed at five years. The need of a more scientific management of the military establishment was seriously felt, and by a bill of February 14, 1903, the office of Lieutenant-General commanding was dropped and a staff corps of eminent officers, appointed by the President, was adopted, in accordance with the policy pursued in European army organizations. Under laws passed in 1901, 1907 and 1908 the army now comprises 30 regiments of infantry, 15 of cavalry, 6 of field artillery, and a coast artillery corps, with a Porto Rico regiment of infantry, and a considerable force in the Philippines, 52 companies of which are native scouts. The total strength of the army is about 87,000, and it is provided by law that it shall not exceed 100,000 men. In addition to these are the organized State militia, a drilled and equipped force of over 120,000 men. These, known as the National Guard, are subject to duty under demand of the government if any national emergency should arise. The militia law of 1903, amended in 1908, provided that 'The militia shall consist of every able-bodied male citizen of the respective States who is more than 18 and less than 45 years of age.' These are to be divided into the organized militia and a reserve militia, subject to duty should necessity demand. The total number of this unorganized reserved militia was stated in 1915 at 20,538,347.

Navy.— The United States has the credit of first demonstrating the advantage of an ironclad navy, this being done in the Civil war by both sides engaged. Britain and France had already built ironclads, but the first battle between ships thus protected was the memorable conflict in Hampton Roads, in 1862, between the *Monitor* and *Merrimac*. The wooden ships of the older navy, previously attacked by the *Merrimac*, proved hopelessly feeble before this powerful antagonist and were put out of service with startling suddenness, and only her encounter with the *Monitor* checked the *Merrimac* in her career of destruction. The lesson thus taught was quickly taken advantage of in Europe, where a rivalry in building iron- and steelclad war-vessels begun which has continued without interruption to the present day. But the United States was very slow in putting into practice the lesson it had taught. Resting secure in its thousands of miles of ocean boundary, it let twenty years pass before it awakened to the advisability of preparing for possible naval war. In 1882 there were 140 vessels on the navy list, but of these 25 were mere tugs, while a large number of the others were antiquated and useless. Shortly after this the government aroused to the need of possessing a modern naval establishment, and began the construction of the powerful navy it has since possessed. Its long negligence left to the European nations the task of experimenting in the new system of war-vessel construction, and gave it the important advantage of participating without cost in lessons learned by a long-continued practical study of the new system in Europe. At the period of the Spanish-American war a navy of fair strength for that date existed, one that with remarkable quickness put the weaker Spanish navy out of commission. Since then many war-vessels fitted to compete on equal terms with the strongest of those possessed by other nations have been built, and in 1912 the United States had, built and building, 28 battleships of recent type with 9 of older type, 12 first-

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class armored cruisers, and a considerable number of second and third-class cruisers, monitors, gunboats, torpedo boats, destroyers and submarines. In this respect it ranks high among other nations, Great Britain considerably and Germany slightly surpassing it in number and strength of war ships. The United States has a satisfactory number of the powerful Dreadnought and super-Dreadnought class. Of these the *Arkansas* and *Wyoming*, with their 26,000 tons displacement and armament of twelve 12-inch guns; the *New York* and *Texas*, 27,000 tons, and the *Nevada* and *Oklahoma*, 27,500 tons, each with ten 14-inch guns, are much surpassed by the 31,400 *Pennsylvania* and *Arizona* and the 32,000 *California*, *Idaho* and *Mississippi* with twelve 14-in. guns each.

History.— The territory now occupied by the United States of America, though it appears to have been visited on its N. E. coast by Norse navigators about the year 1000, continued the sole possession of numerous tribes of Indians till the rediscovery of America by Columbus in 1492. In 1498 an English expedition, under the command of Sebastian Cabot, explored the east coast of America, from Labrador to Virginia, perhaps to Florida. In 1513 Juan Ponce de Leon landed in the Florida peninsula, and explored a portion of that region in a romantic search for the Fountain of Youth. In 1539-1542 Ferdinand de Soto led a Spanish expedition from the coast of Florida across Alabama, and discovered the Mississippi river. In 1584-1585 Sir Walter Raleigh sent two expeditions to the coast of North Carolina and vainly attempted to form settlements on Roanoke Island. A Spanish settlement was made at St. Augustine, Florida, in 1565. The first successful English settlement was that planted at Jamestown, Virginia, in 1607. In 1609 the Dutch explored the Hudson River, and some years later began a settlement on Manhattan Island, New York harbor. Plymouth, Massachusetts, was settled by the Pilgrims, members of a persecuted religious sect, in 1620, and Massachusetts Bay by the Puritans, another sect, in 1628 and 1630. Later settlements were those of Connecticut, in 1633; Maryland, in 1634; Rhode Island, in 1635; Carolina in 1663 and 1670; Pennsylvania in 1682, and Georgia in 1733. Meanwhile the French from Canada, under La Salle and others, had explored the Great Lakes and the Mississippi, and settlements had been made at points in Illinois and along the Mississippi, while Mobile was founded in 1702 and New Orleans in 1718. In 1664 the British dispossessed the Dutch on Manhattan Island, and named the settlement New York. The first effort at a union of the colonies was in 1643, when the settlements in Massachusetts, Connecticut and New Hampshire formed a confederacy for mutual protection called 'The United Colonies of New England.' The growth of the colonies was attended by occasional warlike relations, not only with the Indians, but between the Europeans of different nations. There was war on several occasions between the English of South Carolina and Georgia and the Spanish of Florida, and three successive wars broke out between the British of the North and the French of Canada, in 1689, 1702 and 1744. These were hostilities between the colonists arising from wars in Europe, but in 1754 a more important war begun due to rivalry between the colonists themselves, and which in turn gave rise to an European war. This, known as the French and Indian war, continued until 1763, its origin being an effort of the French to take possession of the Ohio Valley and the determination of the British colonists to prevent this. Its seven years' continuance was attended by varying fortunes of war, the French at first generally successful, the British finally everywhere victorious, Quebec, the capital and military stronghold of Canada, being finally taken. The result was disastrous to France, which was obliged to surrender its possessions in Canada to Great Britain. Its territory west of the Mississippi was transferred to Spain. The close of this war was soon followed by discontent on the part of the colonists with their treatment by the British government. In 1761 the enforcement against smugglers of the oppressive Navigation laws, by the use of general search warrants which gave the customs officials the right to enter and search any domicile, caused a strong excitement against the English government, especially in Boston. Parliament also resolved to increase the revenue by a general stamp-duty through all the American colonies. Accordingly, the Stamp Act of 1765 was passed; but this, after opposition, was repealed next year, Britain still claiming, however, its right to tax. In accordance with this claim a duty, in 1767, was imposed upon tea, paper, glass, etc.; but the colonial opposition was such that three years later the duties were all repealed except the one upon tea. To such a pass had the opposition now come that in 1773, when British ships loaded with tea attempted to effect a landing in the port of Boston,

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a number of the inhabitants, disguised as Indians, seized them and threw their cargoes into the sea. In punishment of this, parliament passed the Boston Port Bill, which declared that port closed to all commerce, and transferred the seat of colonial government to Salem. This caused much suffering in Boston and from this time it became to many evident that a conflict was inevitable. This began in April, 1775, when a British force, sent from Boston to destroy the military stores at Concord, fired upon the colonists at Lexington, and was subsequently attacked and forced to retreat. Before the end of April the British governor and army were besieged in Boston by a revolutionary force of 20,000 men; the northern fortresses of Ticonderoga and Crown Point were seized; and a Continental Congress which assembled at Philadelphia took measures to equip an army and navy, with George Washington, who had won fame in the French and Indian war, as commander-in-chief. On June 17 the British attacked the intrenched position of the colonists on Bunker Hill, which commanded Boston harbor, and captured it with great loss to their troops. In the following year they were forced to evacuate the city and retreat to Halifax. This success encouraged the colonists in their resistance, and it was declared by the thirteen States assembled in Congress that 'The United Colonies are, and ought to be, free and independent States; that their political connection with Great Britain is, and ought to be, dissolved.' This resolution was embodied in a declaration of independence, drawn up by Jefferson and adopted July 4, 1776. The British government now sent an army against the colonists under the command of Sir William Howe, and in a battle on Long Island (August, 1776) Washington was defeated and obliged to abandon New York. He retreated through New Jersey and crossed the Delaware, but later in the year won a victory at Trenton, New Jersey, which enabled him to establish himself in that State and threaten New York. In 1777 the British invaded Pennsylvania by way of Chesapeake Bay, defeated Washington on the Brandywine and captured Philadelphia. Fortune, however, favored the Americans in the north, where General Gates at Stillwater defeated General Burgoyne, his whole army being forced to surrender. This event led to a treaty with France in 1778, and subsequently Spain and Holland gave support to the Americans. The British army now left Philadelphia and the conflict was transferred to the South. Here it was prosecuted with varying fortunes, but in 1781 the surrender of Lord Cornwallis with his army at Yorktown to a combined French and American force under Rochambeau and Washington, virtually terminated the war. On September 3, 1783, Great Britain formally recognized the independence of the United States by a treaty of peace signed at Paris. The new-formed States, however, were very imperfectly united, and in 1787 a convention met at Philadelphia and after four months' deliberation framed a Constitution. This Constitution, which remains the basis of the government, came into operation in March, 1789, and on April 30 Washington became the first president. The Congress appointed by the thirteen States then proceeded to impose duties, establish a federal judiciary, organize the executive administration, fund the debt of the United States, and establish a national bank. In 1792 Washington was unanimously reëlected president, but in 1796 he refused to be elected for a third term. During his administration the States of Vermont, Kentucky, and Tennessee were admitted into the Union. John Adams was elected second president, and it was while he held office that the hostile demeanor of France led to a brief naval war in which all the success lay with the United States. In 1800 the seat of government was transferred from Philadelphia, which had been the capital, to Washington, and in 1803, under President Jefferson the territory of the new Union was immensely added to by the purchase from France of Louisiana, the great region between the Mississippi and the Rocky Mountains. A new source of hostility to Great Britain soon arose from her claim to the allegiance of American naturalized subjects and the right to search American vessels for British seamen. In 1807 the British frigate *Leopard* overhauled the United States frigate *Chesapeake*, near the entrance to Chesapeake Bay, compelled her to surrender, and took off four of her men. Reparation was asked in vain; some time later all trade with France and England was prohibited by Act of Congress, and in June, 1812, war was declared against Great Britain. This lasted until the end of 1814, the armies having varying success upon land, but the Americans winning a brilliant series of naval victories. The final event in the war was Jackson's victory over the British at New Orleans, fought after the treaty of peace had been signed. After this the chief historical events were the wars against the southern Indian tribes and the acquisi-

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tion of Florida from the Spanish in 1819; the annexation of Texas, which led to a war with Mexico in 1846; and the acquisition of a large territory in northern Mexico, consisting of New Mexico and Upper California, which were ceded to the United States on payment of the sum of $15,000,000 to Mexico. The great question during this and the succeeding period was that of slavery in the South, against which a strong party arose in the North. Texas had been introduced into the Union as a slave-holding state, and the endeavor to act similarly with regard to the territory of Kansas led to local conflicts. The question was still further complicated by an antislavery insurrection (1859) at Harper's Ferry, led by John Brown, which helped to bring the question of the abolition of slavery to a crisis. The presidential election of 1860 turned to a great extent upon this question, and when Abraham Lincoln, the Republican candidate, was elected, the slave-holding States of South Carolina, Mississippi, Florida, Alabama, Georgia, Louisiana, and Texas formally seceded from the Union. These States formed themselves into a separate union on February 4, 1861, which they named 'The Confederate States of America,' with Jefferson Davis as president. They were subsequently joined, after hostilities had begun, by Virginia, North Carolina, Tennessee and Arkansas. The custom-houses, arsenals, and United States buildings in these States were seized and occupied by the Confederates, and every preparation made to organize a separate government. War was inevitable, and the first blow was struck on April 12, 1861, the Confederates proceeding to bombard Fort Sumter, in Charleston harbor, which was forced to surrender. President Lincoln then called out by proclamation 75,000 volunteers, and the first battle on a large scale took place at Bull Run, south of Washington, on July 21, the Federal forces being defeated. During the remainder of 1861 frequent collisions took place between the rival forces at different points. In the spring of 1862 General Grant captured Fort Donelson, on the Cumberland River and obtained a victory over the Confederates at Shiloh, or Pittsburgh Landing, in Tennessee. In April the Federal fleet, under Porter, ran past the forts at the entrance of the Mississippi, and aided in the capture of Vicksburg and Arkansas Post. An attempt was then made, by General McClellan to invest Richmond, the capital of the Confederacy, but this was prevented by the Confederate generals Lee and 'Stonewall' Jackson, who drove the Federals back to the James River, where they established themselves. General Lee then assumed the offensive and moved with his whole army upon Washington, defeating General Pope with great loss at Bull Run and invading Maryland. Here he was met on the banks of the Antietam by McClellan, and, after an obstinate fight, compelled to recross the Potomac. Soon afterwards McClellan was superseded by Burnside, and in December another advance to Richmond was commenced. This General Lee had anticipated, and intrenched himself behind the town of Fredericksburg, a position from which the Federals endeavored in vain and with severe loss to dislodge him. In the following April General Hooker, superseding Burnside in the command of the army of the Potomac, commenced another movement towards Richmond, but was defeated by General Lee at Chancellorsville. Following up this gain Lee transferred his army to the valley of the Shenandoah, entered Maryland, and crossed into Pennsylvania. At Gettysburg he unexpectedly encountered the Federal forces under Meade, and after three days of desperate fighting and the loss of 28,000 men was defeated and was forced to retreat into Virginia. On the Mississippi the fortune of war was also in favor of the Federals. Aided by the fleet, which dashed past Port Hudson and seized Natchez, General Grant assumed the offensive and captured Vicksburg with its large garrison, while at the end of this year (1863) he inflicted severe defeat upon Bragg at Chattanooga. In 1864 General Grant, as the result of his successes, was appointed commander-in-chief of all the armies, and at once he set himself to reorganize the Federal forces. He took command of the army of the Potomac himself, with which he proposed to meet Lee, while he despatched Sherman to operate against the Confederate forces in Georgia. In May Grant moved his main force across the Rapidan and immediately attacked Lee in The Wilderness, where severe fighting lasted for six consecutive days. Unable to route the Confederates, Grant endeavored by a flank movement to cut them off from Richmond, but Lee anticipated the attempt and foiled it. Severe battles followed and finally Grant crossed the James River and attacked Petersburg, but was repelled, and obliged to begin a regular siege. Meanwhile Sherman, with a large Federal force, defeated Hood (who had superseded Johnston as commander in Georgia), and occupied

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Atlanta. From this point he crossed the country by forced marches, seized Savannah, and by February, 1865, occupied Charleston and marched into North Carolina. During this brilliant movement the forces under Lee and Grant had faced each other in the lines round Richmond, but in April, 1865, a general advance was made by the Federals. Lee defended Petersburg and Richmond with great skill and obstinacy, but after three days' sanguinary conflict the Confederate lines were broken, and Richmond lay at the mercy of the Northern armies. Lee retreated to Appomattox Court House, but was so closely followed by Grant that he was obliged to surrender with his whole army. The remaining Confederate armies in the field soon afterwards surrendered, and the four years' war ended in favor of the Federal government. In the course of the war the abolition of slavery had been proclaimed by President Lincoln, and he had just entered (April, 1865) upon his second term of the presidency when he was assassinated in Ford's theater at Washington by John Wilkes Booth.

As the seceded States returned to their allegiance to the Union they were readmitted to their state and national privileges, being obliged to agree to a number of amendments to the Constitution, two of which gave the manumitted slaves the rights of citizenship, including that of the suffrage. The election of General Grant to the presidency in 1868 served, in some measure, to consolidate matters. The government declared its ability to pay the enormous war debt, and an attempt was made to reform the civil service. The question of equal rights, without regard to color or previous condition of servitude, gave rise in 1874 to hostile conditions in the Southern States between the negro and the white population. The difficult suppression of the hostile Indians in the northwestern states formed one of the tasks of the Grant administration. His administration was also able by means of arbitration to bring the claim of damages against Great Britain for the depredations of the *Alabama* and other cruisers built there, to a favorable issue for the United States. In 1876 a Centennial Exposition was held in Philadelphia, in celebration of the one hundredth year of American independence. The exhibitors, from all parts of the world, numbered 30,865, and the exposition was the most brilliant which had been held up to that time. After a presidency of two terms General Grant was succeeded by Rutherford B. Hayes, whose election was strongly contested but was granted by an electoral commission formed by compromise between the parties. At the next election (1880) the Republicans elected General Garfield. Soon after (July 2, 1881) he was shot by Charles J. Guiteau, and died Sept. 19, 1881, Chester A. Arthur, the vice-president, becoming president. In 1885 Grover Cleveland, the first Democrat holding the office since 1861, succeeded as president. The Anti-polygamy bill, virtually disfranchising Mormons, became a law in 1886; also the Interstate Commerce bill, establishing a commission to secure uniformity of railroad rates, nationalize through-route traffic, and break up harmful trade combinations. In 1888 North Dakota, South Dakota, Montana and Washington territories were admitted as States. A bill passed in 1879 prohibiting the immigration of Chinese as laborers, amended in 1882 making the restriction to last for 20 years, was further amended in 1888 by taking away from the Chinese now or heretofore in the country the privilege of return unless they had previously procured certificates. President Cleveland retired to private life after a cautious and prudent administration, signalized by patient attention to details and strong assertion of official prerogative. In 1889 Benjamin Harrison, elected by the Republicans, became president, the issue of the campaign being Free-trade *vs.* Protection. One result was the enactment of a strongly protective tariff bill. Acts to admit Wyoming and Idaho as States were passed in 1890. On June 19, 1890, the report of the International American Conference was presented, forming the basis of the policy of reciprocity by which treaties were entered into with Germany, France, Spain, Brazil and the countries of Central and South America. By the end of 1892 these treaties began to bring about an anticipated increase of trade. The Behring Sea question, long a diplomatic stumbling-block between the United States and Great Britain, was, after skillful diplomacy, referred to a board of arbitration. In 1892 Cleveland was re-elected to the Presidency, and during his administration a new tariff bill was passed, under Democratic auspices, reducing the rates but not sufficiently to satisfy the President, who, however, permitted it to become a law without his signature. An interesting event of his administration was a grand exposition of industry held at Chicago in 1893, in honor of the discovery of America by Columbus, four centuries before. Another event of interest, as sustaining the 'Monroe Doc-

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trine,' was the intervention of the President in a controversy between Great Britain and Venezuela in regard to boundary questions. Cleveland went so far as to threaten forcible intervention if Venezuela was despoiled of any of its rightful territory, and demanded a settlement by arbitration. This was finally granted and an amiable settlement reached. In 1896 William McKinley, the Republican candidate, was elected to the presidency. Important events marked his administration. An insurrection against Spain had broken out in Cuba, and the war there was attended by acts of barbarity against which the people of the United States vigorously protested. The battleship *Maine*, sent to Havana harbor, was sunk by an explosion, nearly all on board perishing. This untoward event led to a declaration of war and a brief period of hostilities succeeded, in which the United States was uniformly successful. Santiago, Cuba, was taken, after the destruction of the fleet guarding it, and a similar capture and destruction of a Spanish fleet took place at Manila, capital of the Philippine Islands. The result was the freeing of Cuba from Spanish rule, and the cession to the United States of Porto Rico, the Philippine Islands, and the small Pacific island of Guam. Another event of interest was the annexation to the United States of the Hawaiian Islands, in the mid-Pacific. In 1900 the United States took part in the occupation of Peking, China, as a result of the 'Boxer' outbreak against the national embassies to that country. The gratitude of China was subsequently won by the government of this country, which remitted its share of the large indemnity which the offended nations had exacted.

In 1900 President McKinley was re-elected to the presidency, Theodore Roosevelt being elected vice-president. In September, 1901, the President was shot by an anarchist while visiting an exposition at Buffalo, New York, and died of the wound, Vice-President Roosevelt succeeding to the presidency. Important events of his administration were the full establishment of the republic of Cuba, the purchase by the United States of the partly completed Panama Canal and the taking of active steps towards its completion, the settlement by arbitration of the disputed boundary between Alaska and Canada, and the holding of a magnificent World's Fair at St. Louis, in recognition of the centennial anniversary of the purchase of the great Louisiana territory. There was also important legislation, at the instance of the President, tending to control the operations of railroads and other corporations. In 1904 Roosevelt was elected to the presidency, and during this term instituted a number of reform movements, bills being passed to regulate freight charges on railroads, to prevent the evil of rebates in freight charges, to check unclean methods of meat packing and adulteration of food-stuffs, and to investigate the great business corporations, several of which proved to be nests of fraud and corruption. Among the general events was a Peace Conference held at Portsmouth, N. H., at the instance of President Roosevelt, which brought to an end the terrible war of 1904-1905 between Russia and Japan. In 1906 San Francisco was in great part destroyed by a severe earthquake and subsequent conflagration, causing a loss that elicitated large sympathetic contributions from all parts of the country. Oklahoma Territory and the Indian Territory were united in 1906 and admitted to the Union as a State, which was given the name of Oklahoma. Another event, of spectacular character, was a circumnavigation of the globe by a fleet of American battleships, which visited all the leading ports of the Pacific and returned to Hampton Roads, February 22, 1909. In 1908 William H. Taft, late Secretary of War, was nominated as the Republican candidate for the presidency, elected in November, and inaugurated March 4, 1909. The beginning of his term was signalized by a special session of Congress and the enactment of a new tariff bill making considerable reductions in the customs charges. These reductions were not sufficient to give general satisfaction. President Taft was an advocate of several radical measures, one of these being a treaty of reciprocity with Canada, which was passed, but failed to meet the approval of Canada. The formation of a new party, the Progressive, was one of the notable political events of 1912, and another was the election to the presidency of Woodrow Wilson, a Democrat. The chief events of his administration were the passage of a lower tariff bill; the reform of the currency system; measures regulating corporations; the passage of income tax and popular vote for senators' amendments to the Constitution and semi-warlike relations with Mexico.

Wilson was re-elected in 1916. Tension in the Mexican situation was greatly increased by a raid into American territory by Villa, a Mexican bandit, and a primitive expedition was sent into Mexico and the mobilization of practically the entire national guard, on the border.

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AMERICAN TROOPS MARCHING TO THEIR CAMP IN FRANCE

A long column of "Sammees" just off the transport marching through a historic town "Somewhere in France" on their way to a training camp preparatory to taking their places in the front line trenches.

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German submarine attacks on shipping led to the breaking off of diplomatic relations with Germany in 1917, and war was threatened. The strength of the army was increased to 208,328 and a bill passed for large increases in the navy. The acquisition of the Danish West Indies was completed in 1917.

When the second term of Woodrow Wilson as President of the United States began, on March 4, 1917, the relations between this country and Germany had grown seriously strained as a result of the relentless U-boat war on the part of Germany. It was growing evident that an overt act on the part of the latter country would precipitate war between the two nations. Diplomatic relations between these countries having already been broken, only open hostilities remained, and an attack on the liner *Lucania* by a submarine was regarded as the overt act awaited. Congress was at once called into extra session and on April 4 and 5 the two Houses decided by heavy majorities that a 'state of war' existed between Germany and the United States. This action threw the nation into a state of intense activities and strenuous preparations, for hostile relations at once began. The navy was immediately mobilized, 90 German vessels in American ports (620,000 tons, $148,000,000 value) were taken over by the government, together with 14 Austrian ships. Active financial measures were also instituted, consisting in a revenue bill for a bond issué of $5,000,000,000 and a Liberty Loan for public subscription of $2,000,000,000. Of the sums raised $3,000,000,000 were to be loaned to the European allies of the United States. Other steps taken in war preparation were the conscription of the National Guard of volunteer soldiers into the Federal service and the passage of a selective conscription bill, covering all the young men of the nation between 21 and 31 years of age. Registration for this purpose was made on June 5, 1917, the number registered being about 10,000,000. In July a first draft was made, to cover an army of over 600,000, and a force of regulars was subsequently sent to France, under the command of General Pershing, late commander of the Villa punitive expedition to Mexico. This force was attacked on the high seas by German submarines, but reached Europe in safety. Other important steps taken were for the building of a large number of small vessels, fitted to cope with submarines, and for the construction of 20,000 war aeroplanes for field service at the seat of war. Bills were also passed for the regulation of the food and fuel supply of the country, under the control of Herbert C. Hoover and Harry A. Garfield, and an embargo on commerce between the United States and the neutral nations of Northern Europe which had been supplying Germany with war materials purchased in the United States. In October a second Liberty Loan was negotiated, the large sum of about $5,000,000,000 being obtained from the people by these loans. Congress adjourned on October 6, after passing a war loan tax estimated to yield $2,534,870,000 of revenue, chiefly by increased levies upon incomes and taxes on excess war profits. It also included an increase in the postal rates, stamps on checks, on theater tickets, travelers' tickets and various other items of daily use. The second war appropriation of Congress in 1917 covered the large total of $4,810,779,370, of which $3,771,927,320 was made available for immediate use. This was the largest appropriation ever made in the United States, exceeding by more than $2,000,000,000 the first bill passed. The war bond bill passed by Congress on September 6 amounted to $11,538,945,460.

When Congress came again into session on December 3, its first act was to declare war against Austria, this being carried with only one dissenting vote. During the war a number of munition plants, stores of materials, vessels laden with war supplies, etc., had been destroyed, presumably by spies, and it became necessary to take steps to prevent German and Austrian residents in this country from work of this kind and to pass stringent laws dealing with spies and alien enemies. Aliens were not permitted upon the water fronts of the seaport cities unless with permits, and decisive measures were taken to protect all depots of supplies. The industrial staff of the country was largely employed in the production of war materials, the railroads were requisitioned for the transportation and such materials and all the products of the country held subject to government demands. All this led to a large increase in the prices of food, fuel and other necessaries of life, some of these growing very scarce and dear, while the railroad service became so congested that on December 28 the President took possession and assumed control of the railroad lines of the country and the systems of water transportation under their control. William G. McAdoo was appointed Director General. Meanwhile large numbers of the newly organized army were transported to France without loss, the seas in the danger zone being patrolled by swift destroyers. The new recruits were put under intensive training on French soil and before the

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year ended many of them were in the trenches, getting their final discipline under the guns of the foe. Their presence on the battlefield and a large increase in their numbers were felt to be absolutely necessary. The coal situation became acute at the end of 1917 and the beginning of 1918, and to relieve it the President ordered cessation of general industries for a period of five days and the Monday of each week for several weeks.

Literature.—The first literary work of any consequence in the United States was a translation of Ovid's *Metamorphoses* by George Sandys, written in Virginia (1620) and published in London (1626), and a Puritan edition of the *Psalms* (1640). The journals and annals of John Winthrop (1588-1649), governor of Massachusetts, Edward Winslow (1595-1655), governor of Plymouth colony, Nathaniel Morton (1613-85), etc., have been valuable to the historian. The most notable of the earlier writers were the theologians, such as Increase and Cotton Mather, Roger Williams, and above all Jonathan Edwards. The only one whose writings are still read to any extent was Benjamin Franklin, whose *Autobiography* and *Poor Richard's Almanac* are the only popular literature remaining from the colonial period. The succeeding or revolutionary era was chiefly remarkable for its political writers, among whom were James Otis (1725-83), Josiah Quincy (1744-75). John Adams (1735-1826), Thomas Jefferson (1743-1826), Alexander Hamilton (1757-1804), John Jay (1745-1829), and James Madison (1751-1836). Of historical writings belonging to this period there were the *History of New England* by Hannah Adams; of the *American Revolution*, by William Gordon and David Ramsay, and the *Annals of America*, by Abiel Holmes. Philology was represented at this time by Lindley Murray (1745-1826), and by Noah Webster (1758-1843), the compiler of a famous dictionary. The list of poets includes Philip Freneau (1732-1832), John Trumbull (1750-1831), and Joel Barlow (1755-1812). The first well-known novelist was Charles Brockden Brown (1771-1810).

It was not, however, until the nineteenth century that the United States produced the higher forms of pure literature. The poets of this epoch may be headed by William Cullen Bryant (1794-1878), and following him come Richard H. Dana (1787-1879). Charles Sprague (1791-1875), James G. Percival (1795-1856), Joseph R. Drake (1795-1820), Washington Allston (1779-1843), Fitz-Greene Halleck (1790-1867), and Mrs. Sigourney (1791-1865); the song-writers, Francis Scott Key, Samuel Woodworth, John H. Payne (author of 'Home, Sweet Home'), and Stephen C. Foster. The later and in part more famous names are John G. Whittier (1807-92), Henry W. Longfellow (1807-82), Edgar A. Poe (1808-49), James Russell Lowell (1819-91), Ralph Waldo Emerson (1803-82), Oliver W. Holmes (1809-94), Walt Whitman (1819-92), Thomas B. Aldrich (1836-1907), Alice Cary (1820-71), and others of later date. The prominent novelists include James Fenimore Cooper (1789-1851), James Kirke Paulding (1779-1860), John P. Kennedy (1795-1870), William G. Simms (1806-70), Nathaniel Hawthorne (1804-64), Harriet Beecher Stowe (1811-96), and Bayard Taylor (1825-78). Those of more recent date include William Dean Howells, Francis M. Crawford, Frances H. Burnett, Henry James, George W. Cable, Francis Bret Harte, Mary N. Murfree, Frank Stockton, Louisa May Alcott, etc. There are also many writers of the short tale, most famous among them being Edgar Allan Poe, followed by others too numerous to mention. Humorous writers also became numerous, the most famous among them being Washington Irving, James Russell Lowell, Samuel L. Clemens ('Mark Twain') and Charles Farrar Brown ('Artemus Ward').

The United States has been the birthplace of a number of historians of superior merit, chief among whom are George Bancroft (1800-91), John Fiske (1842-1901), William H. Prescott (1796-1859), George Ticknor (1791-1871), John Lothrop Motley (1814-77), Francis Parkman (1823-93), Woodrow Wilson (born 1856), John Bach McMaster (born 1852), and others. Of writers who achieved fame in other fields than those mentioned may be named Washington Irving, Ralph Waldo Emerson, whose *Essays* are of world-wide fame; Henry D. Thoreau, Bayard Taylor, William Ellery Channing and George W. Curtis. The orators of high reputation include such well-known names as Patrick Henry, Daniel Webster, Henry Clay, John C. Calhoun, Edward Everett, Wendell Phillips, Henry Ward Beecher and Charles Sumner. This compilation of names is by no means exhaustive, and there are many writers of recent date that might well have been added, but the list given includes the most famous of American literary artists.

United States, POLITICAL DEVELOPMENT OF THE. The description of the United States so far given is confined to its natural conditions and its industrial, historical and

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literary progress. To gain a fuller idea of its progress and significance as a whole, it seems desirable to speak of its political development, as exemplified in the several great State papers which have been from time to time issued, and which have few counterparts in the history of any other country. The United States differs from republics in general in the fact that its system is the result of a gradual evolution instead of a revolutionary overthrow, as in the case of France; or of imitation, as in the case of the other American republics, the governments of which were based upon that of the United States. The republic of Switzerland alone resembles that of the United States as being a result of political evolution. But it is on so small a scale that it cannot properly be compared to the giant federal organization of the United States, which ranks in size with the greatest of the world's nations, covering half a continent. The stages by which the organization of this great government was reached are indicated in the Declaration of Independence, the Constitution, and the other great documents which appeared from time to time, each as the outcome of a period of preceding development and each as a stepping stone of a future development in the great problem of political progress. This country has been democratic in sentiment from its origin in the colonies that settled at successive periods, along the Atlantic coast, their people plainly indicating this feeling, and resisting all efforts to subject them to the dominance of king or parliament without due representation. They insisted on having their own legislatures, making their own laws, paying their own officials, and in other ways maintaining a just degree of independence. This spirit is shown in all the American State papers.

At a very early date in the history of the United States, that on which the Pilgrims sought a new home beyond the seas on the bleak New England shore, the immigrants gathered in the cabin of their little ship, the *Mayflower*, and drew up for themselves a compact of government in which they determined to make their own laws and choose their own governors. This brief declaration of intentions, dating from 1620, forms the first chapter in the great volume of documentary American history, and we give it here as the genesis of American political progress.

THE *MAYFLOWER* COMPACT

In the name of God, Amen: We, whose names are underwritten, the loyall subjects of our dread Soveraigne Lord King James, by ye grace of God of Great Britaine, France, and Ireland, King, defender of ye faith, &c., having undertaken, for ye glorie of God and advancement of ye Christian faith, and honour of our King and countrie, a voyage to plant the first colony in ye Northerne parts of Virginia, doe by these presents solemnly and mutually in ye presence of God and one of another, covenant and combine ourselves together into a civill body politick, for our better ordering and preservatione and furtherance of ye ends aforesaid; and by vertue hereof to enact, constitute, and frame such just and equall lawes, ordinances, acts, constitutions, and offices, from time to time, as shall be thought most meete and convenient for ye generall good of ye colonie, unto which we promise all due submission and obedience. In witness whereof we have hereunto subscribed our names, *Cape Cod* 11 of *November*, in the yeare of the raigne of our Soveraigne Lord King James of *England*, *France*, and *Ireland* 18 and of *Scotland* 54. *Anno Domini*, 1620.

Passing onward down the road of development, it is proper to state that Virginia had already a legislature of its own election, though under a governor appointed by the king. The New England colonies went farther, electing their own legislatures and governors and making their own laws, so that from their origin they were practically republics, their allegiance to the distant king being one rather of formality than of submission. In 1639 the New Haven colony became so liberal as to give all freemen the right to vote, embodying this principle in a written instrument, the first known in history drawn up by a people for their own government. The document made no mention of the English king or company, and was in effect the constitution of a separate republic. In 1643 a step was taken towards the formation of a federal republic, the colonies of Plymouth, Massachusetts, Connecticut and New Haven forming a confederation for defense against the Dutch and Indians. This they called 'The United Colonies of New England.'

The time came when it appeared desirable to combine all the colonies for defensive purposes, and in 1754 a convention was held in Albany in which the question of a general union was brought forward. Of the several plans offered that of Benjamin Franklin was adopted. It provided for a union of the colonies under the following terms:

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Franklin suggested that Philadelphia, the most central large city, should be the capital of the united colonies. The government sitting here was to consist of a grand council, elected every third year by the colonies, but holding yearly meetings, with a governor-general appointed by the king with power of veto over all laws. This government was to have the power to make general laws, levy taxes, regulate commerce and perform other governmental duties. This governmental scheme proved in advance of the times and was rejected, the colonies thinking that it took too much power from them to give it to the general government, the king that it gave too much power to the colonies.

The first colonial congress held in America was that known as the 'Stamp Act Congress,' held at New York in 1765, and composed of delegates from nine of the colonies, its purpose being to consider the threatening relations between the Parliament of Britain and the colonies of America. It made an appeal to the king for American rights. In 1774 the idea of colonial union had further advanced and the 'First Continental Congress' met in Philadelphia, all the colonies but Georgia being represented. It also petitioned the king to redress the wrongs of the colonists, and drew up a declaration of rights. It did not ask for American representation in Parliament, but demanded the right to make all laws, except those relating to foreign commerce, and to levy all taxes needed for colonial uses. In 1775 the 'Second Continental Congress' met, with delegates from all the colonies. This issued a 'Declaration of Colonial Rights,' and on July 4, 1776, a 'Declaration of Independence.' This famous paper, with which the history of the United States began, is here given.

THE DECLARATION OF INDEPENDENCE

IN CONGRESS JULY 4, 1776.

The unanimous declaration of the thirteen United States of America. When in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the Laws of Nature and of Nature's God entitles them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness. That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed. That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient causes; and accordingly all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object, evinces a design to reduce them under absolute Despotism, it is their right, it is their duty, to throw off such Government, and to provide new Guards for their future security. Such has been the patient sufferance of these Colonies; and such is now the necessity which constrains them to alter their former Systems of Government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute Tyranny over these States. To prove this, let Facts be submitted to a candid world.

He has refused his Assent to Laws, the most wholesome and necessary for the public good.

He has forbidden his Governors to pass Laws of immediate and pressing importance, unless suspended in their operation till his Assent should be obtained; and when so suspended, he has utterly neglected to attend to them.

He has refused to pass other Laws for the accommodation of large districts of people, unless those people would relinquish the right of Representation in the Legislature, a right inestimable to them and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public Records, for the sole purpose of fatiguing them into compliance with his measures.

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He has dissolved Representative Houses repeatedly, for opposing with manly firmness his invasions on the rights of the people.

He has refused for a long time, after such dissolutions, to cause others to be elected; whereby the Legislative powers, incapable of Annihilation, have returned to the People at large for their exercise; the State remaining in the meantime exposed to all the dangers of invasion from without, and convulsions within.

He has endeavored to prevent the population of these States; for that purpose obstructing the Laws for Naturalization of Foreigners, refusing to pass others to encourage their migrations hither, and raising the conditions of new Appropriations of Lands.

He has obstructed the Administration of Justice, by refusing his Assent to Laws for establishing Judiciary Powers.

He has made Judges dependent on his Will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of New Offices, and sent hither swarms of Officers to harass our people, and eat out their substance.

He has kept among us, in times of peace, Standing Armies without the Consent of our legislature.

He has affected to render the Military independent of and superior to the Civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his Assent to their Acts of pretended Legislation:

For quartering large bodies of armed troops among us.

For protecting them, by a mock Trial, from punishment for any Murders which they should commit on the Inhabitants of these States:

For cutting off our Trade with all parts of the world:

For imposing Taxes on us without our Consent:

For depriving us in many cases of the benefits of Trial by jury:

For transporting us beyond Seas to be tried for pretended offences:

For abolishing the free System of English Laws in a neighboring Province, establishing therein an Arbitrary government, and enlarging its Boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies:

For taking away our Charters, abolishing our most valuable Laws, and altering fundamentally the Forms of our Governments:

For suspending our own Legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated Government here, by declaring us out of his Protection and waging War against us.

He has plundered our seas, ravaged our Coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large Armies of foreign Mercenaries to complete the works of death, desolation and tyranny, already begun with circumstances of Cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the Head of a civilized nation.

He has constrained our fellow-Citizens taken captive on the high Seas to bear Arms against their Country, to become the executioners of their friends and Brethren, or to fall themselves by their Hands.

He has excited domestic insurrections among us, and has endeavored to bring on the inhabitants of our frontiers, the merciless Indian Savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes and conditions.

In every stage of these Oppressions We have Petitioned for Redress in the most humble terms. Our repeated Petitions have been answered only by repeated injury. A Prince, whose character is thus Marked by every act which may define a Tyrant, is unfit to be the ruler of a free people.

Nor have We been wanting in attentions to our British brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must therefore, acquiesce in the necessity which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends.

We, THEREFORE, the REPRESENTATIVES of the UNITED STATES OF AMERICA, IN GENERAL CONGRESS Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in

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the Name, and by authority of the good People of these Colonies, solemnly PUBLISH and DECLARE, That these United Colonies are, and of Right ought to be FREE AND INDEPENDENT States; that they are Absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Great Britain, is and ought to be totally dissolved; and that as FREE AND INDEPENDENT STATES, they have full Power to levy War, conclude Peace, contract Alliances, establish Commerce, and to do all other Acts and Things which INDEPENDENT STATES may of right do. And for the support of this Declaration, with a firm reliance on the protection of Divine Providence, We mutually pledge to each other our Lives, our Fortunes, and our sacred Honor.

In this notable paper the colonies united in declaring their independence from Great Britain, but they were still separate commonwealths, though fighting together for one general object. Something further was needed. In the Declaration they called themselves simply 'Free and Independent States.' If they were to be 'United States' a great further step in political evolution was needed. To win their independence an actual Union appeared necessary, and on July 11, 1776, the Continental Congress appointed a committee to draw up a form of confederation for the States. This was completed and signed July 9, 1778, but its ratification was made gradually by the several States, Maryland being the last to accept it (January 30, 1781). The first Congress under the confederation met on March 2, 1781. This first form of a United States Constitution is of much importance as a step forward towards a firm and durable Union. It is here appended:

THE ARTICLES OF CONFEDERATION

ARTICLES OF CONFEDERATION AND PERPETUAL UNION BETWEEN THE STATES OF NEW HAMPSHIRE, MASSACHUSETTS BAY, RHODE ISLAND AND PROVIDENCE PLANTATIONS, CONNECTICUT, NEW YORK, NEW JERSEY, PENNSYLVANIA, DELAWARE, MARYLAND, VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA.

Article I. The style of this Confederacy shall be, 'The United States of America.'

Article II. Each State retains its sovereignty, freedom, and independence, and every power, jurisdiction, and right, which is not by this Confederation expressly delegated to the United States in Congress assembled.

Article III. The said States hereby severally enter into a firm league of friendship with each other, for their common defence, the security of their liberties, and their mutual and general welfare, binding themselves to assist each other against all force offered to, or attacks made upon them, or any of them, on account of religion, sovereignty, trade, or any other pretence whatever.

Article IV. The better to secure and perpetuate mutual friendship and intercourse among the people of the different States in this Union, the free inhabitants of each of these States, paupers, vagabonds, and fugitives from justice excepted, shall be entitled to all privileges and immunities of free citizens in the several States; and the people of each State shall have free ingress and egress to and from any other State, and shall enjoy therein all the privileges of trade and commerce subject to the same duties, impositions, and restrictions as the inhabitants thereof respectively; provided that such restrictions shall not extend so far as to prevent the removal of property imported into any State to any other State of which the owner is an inhabitant; provided also, that no imposition, duties, or restriction shall be laid by any State on the property of the United States or either of them. If any person guilty of, or charged with, treason, felony, or other high misdemeanor in any State shall flee from justice and be found in any of the United States, he shall, upon demand of the governor or executive power of the State from which he fled, be delivered up and removed to the State having jurisdiction of his offence. Full faith and credit shall be given in each of these States to the records, acts, and judicial proceedings of the courts and magistrates of every other State.

Article V. For the more convenient management of the general interests of the United States, delegates shall be annually appointed in such manner as the Legislature of each State shall direct, to meet in Congress on the first Monday in November, in every year, with a power reserved to each State to recall its delegates, or any of them, at any time within the year, and to send others in their stead for the remainder of the year. No State shall be represented in Congress by less than two, nor by more than seven members; and no person shall be

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capable of being a delegate for more than three years in any term of six years; nor shall any person, being a delegate, be capable of holding any office under the United States for which he, or another for his benefit, receives any salary, fees, or emolument of any kind. Each State shall maintain its own delegates in any meeting of the States and while they act as members of the Committee of the States. In determining questions in the United States in Congress assembled, each State shall have one vote. Freedom of speech and debate in Congress shall not be impeached or questioned in any court or place out of Congress; and the members of Congress shall be protected in their persons from arrests and imprisonments during the time of their going to and from, and attendance on, Congress, except for treason, felony, or breach of the peace.

Article VI. No State, without the consent of the United States in Congress assembled, shall send any embassy to, or receive any embassy from, or enter into any conference, agreement, alliance, or treaty with any king, prince, or state; nor shall any person holding any office of profit or trust under the United States, or any of them, accept of any present, emolument, office, or title of any kind whatever from any king, prince, or foreign state; nor shall the United States in Congress assembled, or any of them, grant any title of nobility.

No two or more States shall enter into any treaty, confederation, or alliance whatever between them, without the consent of the United States in Congress assembled, specifying accurately the purposes for which the same is to be entered into, and how long it shall continue.

No State shall lay any imposts or duties which may interfere with any stipulations in treaties entered into by the United States in Congress assembled with any king, prince, or state, in pursuance of any treaties already proposed by Congress to the courts of France and Spain.

No vessel of war shall be kept up in time of peace by any State, except such number only as shall be deemed necessary by the United States in Congress assembled for the defence of such State or its trade, nor shall any body of forces be kept up by any State in time of peace, except such number only as, in the judgment of the United States in Congress assembled shall be deemed requisite to garrison the forts necessary for the defence of such State; but every State shall always keep up a well-regulated and disciplined militia, sufficiently armed and accoutred, and shall provide and constantly have ready for use in public stores a due number of field-pieces and tents, and a proper quantity of arms, ammunition, and camp equipage.

No State shall engage in any war without the consent of the United States in Congress assembled, unless such State be actually invaded by enemies, or shall have received certain advice of a resolution being formed by some nation of Indians to invade such State, and the danger is so imminent as not to admit of a delay till the United States in Congress assembled can be consulted; nor shall any State grant commissions to any ships or vessels of war, nor letters of marque or reprisal, except it be after a declaration of war by the United States in Congress assembled, and then only against the kingdom or state, and the subjects thereof, against which war has been so declared, and under such regulations as shall be established by the United States in Congress assembled, unless such State be infested by pirates, in which case vessels of war may be fitted out for that occasion, and kept so long as the danger shall continue, or until the United States in Congress assembled shall determine otherwise.

Article VII. When land forces are raised by any State for the common defence, all officers of or under the rank of Colonel shall be appointed by the Legislature of each State respectively by whom such forces shall be raised, or in such manner as such State shall direct, and all vacancies shall be filled up by the State which first made the appointment.

Article VIII. All charges of war, and all other expenses that shall be incurred for the common defence, or general welfare, and allowed by the United States in Congress assembled, shall be defrayed out of a common treasury, which shall be supplied by the several States in proportion to the value of all land within each State, granted to, or surveyed for, any person, as such land and the buildings and improvements thereon shall be estimated, according to such mode as the United States in Congress assembled shall, from time to time, direct and appoint. The taxes for paying that proportion shall be laid and levied by the authority and direction of the Legislatures of the several States, within the time agreed upon by the United States in Congress assembled.

Article IX. The United States in Congress assembled shall have the sole

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and exclusive right and power of determining on peace and war, except in the cases mentioned in the sixth Article; of sending and receiving ambassadors; entering into treaties and alliances, provided that no treaty of commerce shall be made, whereby the legislative power of the respective States shall be restrained from imposing such imposts and duties on foreigners as their own people are subjected to, or from prohibiting the exportation or importation of any species of goods or commodities whatever; of establishing rules for deciding, in all cases, what captures on land or water shall be legal, and in what manner prizes taken by land or naval forces in the service of the United States shall be divided or appropriated; of granting letters of marque and reprisal in times of peace; appointing courts for the trial of piracies and felonies committed on the high seas; and establishing courts for receiving and determining finally appeals in all cases of captures; provided that no member of Congress shall be appointed a judge of any of the said courts.

The United States in Congress assembled shall also be the last resort on appeal in all disputes and differences now subsisting, or that hereafter may arise between two or more States concerning boundary, jurisdiction, or any other cause whatever; which authority shall always be exercised in the manner following: Whenever the legislative or executive authority, or lawful agent of any State in controversy with another, shall present a petition to Congress, stating the matter in question, and praying for a hearing, notice thereof shall be given by order of Congress to the legislative or executive authority of the other State in controversy, and a day assigned for the appearance of the parties by their lawful agents, who shall then be directed to appoint, by joint consent, commissioners or judges to constitute a court for hearing and determining the matter in question; but if they cannot agree, Congress shall name three persons out of each of the United States, and from the list of such persons each party shall alternately strike out one, the petitioners beginning, until the number shall be reduced to thirteen; and from that number not less than seven nor more than nine names, as Congress shall direct, shall, in the presence of Congress, be drawn out by lot; and the persons whose names shall be so drawn, or any five of them, shall be commissioners or judges, to hear and finally determine the controversy, so always as a major part of the judges who shall hear the cause shall agree in the determination; and if either party shall neglect to attend at the day appointed, without showing reasons which Congress shall judge sufficient, or being present, shall refuse to strike, the Congress shall proceed to nominate three persons out of each State, and the secretary of Congress shall strike in behalf of such party absent or refusing; and the judgment and sentence of the court, to be appointed in the manner before prescribed, shall be final and conclusive; and if any of the parties shall refuse to submit to the authority of such court, or to appear or defend their claim or cause, the court shall nevertheless proceed to pronounce sentence or judgment, which shall in like manner be final and decisive; the judgment or sentence and other proceedings being in either case transmitted to Congress, and lodged among the acts of Congress for the security of the parties concerned; provided, that every commissioner, before he sits in judgment, shall take an oath, to be administered by one of the judges of the supreme or superior court of the State where the cause shall be tried, 'well and truly to hear and determine the matter in question, according to the best of his judgment, without favor, affection, or hope of reward.' Provided, also, that no State shall be deprived of territory for the benefit of the United States.

All controversies concerning the private right of soil claimed under different grants of two or more States, whose jurisdictions, as they may respect such lands, and the States which passed such grants are adjusted, the said grants or either of them being at the same time claimed to have originated antecedent to such settlement of jurisdiction, shall, on the petition of either party to the Congress of the United States, be finally determined, as near as may be, in the same manner as is before prescribed for deciding disputes respecting territorial jurisdiction between different States.

The United States in Congress assembled shall also have the sole and exclusive right and power of regulating the alloy and value of coin struck by their own authority, or by that of the respective States; fixing the standard of weights and measures throughout the United States; regulating the trade and managing all affairs with the Indians, not members of any of the States; provided that the legislative right of any State, within its own limits, be not infringed or violated; establishing and regulating post-offices from one State to

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another, throughout all the United States, and exacting such postage on the papers passing through the same as may be requisite to defray the expenses of the said office; appointing all officers of the land forces in the service of the United States, excepting regimental officers; appointing all the officers of the naval forces, and commissioning all officers whatever in the service of the United States; making rules for the government and regulation of the said land and naval forces, and directing their operations.

The United States in Congress assembled shall have authority to appoint a committee, to sit in the recess of Congress, to be denominated 'a Committee of the States,' and to consist of one delegate from each State, and to appoint such other committees and civil officers as may be necessary for managing the general affairs of the United States under their direction; to appoint one of their number to preside; provided that no person be allowed to serve in the office of president more than one year in any term of three years; to ascertain the necessary sums of money to be raised for the service of the United States, and to appropriate and apply the same for defraying the public expenses; to borrow money or emit bills on the credit of the United States, transmitting every half year to the respective States an account of the sums of money so borrowed or emitted; to build and equip a navy; to agree upon the number of land forces, and to make requisitions from each State for its quota, in proportion to the number of white inhabitants in each State, which requisition shall be binding; and thereupon the Legislature of each State shall appoint the regimental officers, raise the men, and clothe, arm, and equip them in a soldier-like manner, at the expense of the United States; and the officers and men so clothed, armed, and equipped shall march to the place appointed, and within the time agreed on by the United States in Congress assembled; but if the United States in Congress assembled shall, on consideration of circumstances, judge proper that any State should not raise men, or should raise a smaller number than its quota, and that any other State should raise a greater number of men than the quota thereof, such extra number shall be raised, officered, clothed, armed, and equipped in the same manner as the quota of such State, unless the Legislature of such State shall judge that such extra number cannot be safely spared out of the same, in which case they shall raise, officer, clothe, arm, and equip as many of such extra number as they judge can be safely spared, and the officers and men so clothed, armed, and equipped shall march to the place appointed, and within the time agreed on by the United States in Congress assembled.

The United States in Congress assembled shall never engage in a war, nor grant letters of marque and reprisal in time of peace, nor enter into any treaties or alliances, nor coin money, nor regulate the value thereof, nor ascertain the sums and expenses necessary for the defence and welfare of the United States, or any of them, nor emit bills, nor borrow money on the credit of the United States, nor appropriate money, nor agree upon the number of vessels of war to be built or purchased, or the number of land or sea forces to be raised, nor appoint a commander-in-chief of the army or navy, unless nine States assent to the same, nor shall a question on any other point, except for adjourning from day to day, be determined, unless by the votes of a majority of the United States in Congress assembled.

The Congress of the United States shall have power to adjourn to any time within the year, and to any place within the United States, so that no period of adjournment be for a longer duration than the space of six months, and shall publish the journal of their proceedings monthly, except such parts thereof relating to treaties, alliances, or military operations as in their judgment require secrecy; and the yeas and nays of the delegates of each State, on any question, shall be entered on the journal when it is desired by any delegate; and the delegates of a State, or any of them, at his or their request, shall be furnished with a transcript of the said journal except such parts as are above excepted, to lay before the Legislatures of the several States.

Article X. The Committee of the States, or any nine of them, shall be authorized to execute, in the recess of Congress, such of the powers of Congress as the United States in Congress assembled, by the consent of nine States, shall, from time to time, think expedient to vest them with; provided that no power be delegated to the said Committee, for the exercise of which, by the Articles of Confederation, the voice of nine States in the Congress of the United States assembled is requisite.

Article XI. Canada, acceding to this Confederation, and joining in the measures of the United States, shall be ad-

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mitted into, and entitled to all the advantages of this Union; but no other colony shall be admitted into the same, unless such admission be agreed to by nine States.

Article XII. All bills of credit emitted, moneys borrowed, and debts contracted by or under the authority of Congress, before the assembling of the United States, in pursuance of the present Confederation, shall be deemed and considered as a charge against the United States, for payment and satisfaction whereof the said United States and the public faith are hereby solemnly pledged.

Article XIII. Every State shall abide by the determinations of the United States in Congress assembled on all questions which by this Confederation are submitted to them. And the Articles of this Confederation shall be inviolably observed by every State, and the Union shall be perpetual; nor shall any alteration at any time hereafter be made in any of them, unless such alteration be agreed to in a Congress of the United States, and be afterwards confirmed by the Legislatures of every State.

AND WHEREAS it hath pleased the Great Governor of the world to incline the hearts of the Legislatures we respectively represent in Congress to approve of, and to authorize us to ratify, the said Articles of Confederation and perpetual Union, know ye, that we, the undersigned delegates, by virtue of the power and authority to us given for that purpose, do, by these presents, in the name and in behalf of our respective constituents, fully and entirely ratify and confirm each and every of the said Articles of Confederation and perpetual Union, and all and singular the matters and things therein contained. And we do further solemnly plight and engage the faith of our respective constituents, that they shall abide by the determinations of the United States in Congress assembled on all questions which by the said Confederation are submitted to them; and that the Articles thereof shall be inviolably observed by the States we respectively represent, and that the Union shall be perpetual.

The Articles of Confederation served their purpose while the war for independence continued. The necessity of working together was then imperative. But the war had no sooner ended than their innate weakness became apparent. The States had kept too large a share of power for themselves and left the Confederation a weak and almost powerless body. They had retained the power of taxation, which proved a fatal defect. No Union could hold together with the purse-strings in the hands of thirteen semi-independent commonwealths. Also there was no President, Congress being at once the legislative and the executive body. The new government could pass laws but could not make the people obey them. It could incur debt but could not tax the people for money to pay its debts. The States were to provide money for this purpose, but they showed little inclination to do so. They were jealous of one another and each was inclined to act as a single nation. Washington thus described the situation: 'We are one nation to-day and thirteen to-morrow.' Evidently the political evolution of the United States was far from complete. It must go farther or go back to dissolution; be one strong nation or thirteen weak ones. The last alternative frightened the States. They were already being pressed and threatened by foreign nations. Feeling that they could not stand alone, and could not keep together under the Articles of Confederation, a convention was called to revise these Articles. It met at Philadelphia in 1787. The Articles of Confederation proved unsuited for revision, no change could make them serve the purpose, and the convention devoted its four months of labor to working out a new Constitution. This Constitution, as afterwards amended, is that under which the United States has since been governed. Gladstone has spoken of it as the greatest document ever produced by the force of human genius. Its full text, with its amendments, follows, with the understanding that the headlines of the several sections as here given, such as 'Preamble,' 'Legislative Powers,' etc., are appended for the convenience of readers, and do not occur in the original document:

CONSTITUTION OF THE UNITED STATES

Preamble.— We, the people of the United States, in order to form a more perfect Union, establish justice, insure domestic tranquillity, provide for the common defence, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this CONSTITUTION for the United States of America.

Article I. Legislative Powers.— SECTION I. All legislative powers herein granted shall be vested in a Congress of

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the United States, which shall consist of a Senate and House of Representatives.

House of Representatives.— SECTION II. 1. The House of Representatives shall be composed of members chosen every second year by the people of the several States, and the electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

Qualifications of Representatives.— 2. No person shall be a Representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

Apportionment of Representatives.— 3. Representatives and direct taxes shall be apportioned among the several States which may be included within this Union according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand, but each State shall have at least one Representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose 3; Massachusetts, 8; Rhode Island and Providence Plantations, 1; Connecticut, 5; New York, 6; New Jersey, 4; Pennsylvania, 8; Delaware, 1; Maryland, 6; Virginia, 10; North Carolina, 5; South Carolina, 5, and Georgia, 3.*

Vacancies, How Filled.— 4. When vacancies happen in the representation from any State, the Executive Authority thereof shall issue writs of election to fill such vacancies.

Officers, How Appointed.— 5. The House of Representatives shall choose their Speaker and other officers, and shall have the sole power of impeachment.

Senate.— SECTION III. 1. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six years; and each Senator shall have one vote.

Classification of Senators.— 2. Immediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every second year; and if vacancies happen by resignation, or otherwise, during the recess of the Legislature of any State, the Executive thereof may make temporary appointments until the next meeting of the Legislature, which shall then fill such vacancies.

Qualifications of Senators.— 3. No person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State for which he shall be chosen.

President of the Senate.— 4. The Vice-President of the United States shall be President of the Senate, but shall have no vote unless they be equally divided.

5. The Senate shall choose their other officers, and also a President pro tempore, in the absence of the Vice-President, or when he shall exercise the office of President of the United States.

Senate a Court for Trial of Impeachments.— 6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

Judgment in Case of Conviction.— 7. Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

Elections of Senators and Representatives.— SECTION IV. 1. The times, places, and manner of holding elections for Senators and Representatives shall be prescribed in each State by the Legislature thereof; but the Congress may at any time by law make or alter such regulations, except as to places of choosing Senators.

Meeting of Congress.— 2. The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless

* See Article XIV, Amendments.

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they shall by law appoint a different day.

Organization of Congress.— SECTION V. 1. Each House shall be the judge of the elections, returns, and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members in such manner and under such penalties as each House may provide.

Rule of Proceedings.— 2. Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and with the concurrence of two-thirds expel a member.

Journals of each House.— 3. Each House shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either House on any question shall, at the desire of one-fifth of those present, be entered on the journal.

Adjournment of Congress.— 4. Neither House, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

Pay and Privileges of Members.— SECTION VI. 1. The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the session of their respective Houses, and in going to and returning from the same; and for any speech or debate in either House they shall not be questioned in any other place.

Other Offices Prohibited.— 2. No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States which shall have been created, or the emoluments whereof shall have been increased during such time; and no person holding any office under the United States shall be a member of either House during his continuance in office.

Revenue Bills.— SECTION VII. 1. All bills for raising revenue shall originate in the House of Representatives, but the Senate may propose or concur with amendments, as on other bills.

How Bills Become Laws.— 2. Every bill which shall have passed the House of Representatives and the Senate shall, before it become a law, be presented to the President of the United States; if he approve, he shall sign it, but if not, he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered; and if approved by two-thirds of that House it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law, in like manner as if he had signed it, unless the Congress by their adjournment prevent its return; in which case it shall not be a law.

Approval and Veto Powers of the President.— 3. Every order, resolution, or vote to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment) shall be presented to the President of the United States; and before the same shall take effect shall be approved by him, or, being disapproved by him, shall be repassed by two-thirds of the Senate and the House of Representatives, according to the rules and limitations prescribed in the case of a bill.

Powers Vested in Congress.— SECTION VIII. 1. The Congress shall have power:

To lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defence and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States.

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, and among the several States, and with the Indian tribes.

4. To establish a uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States.

5. To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures.

6. To provide for the punishmert of

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counterfeiting the securities and current coin of the United States.

7. To establish post-offices and post-roads.

8. To promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries.

9. To constitute tribunals inferior to the Supreme Court.

10. To define and punish piracies and felonies committed on the high seas, and offences against the law of nations.

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water.

12. To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years.

13. To provide and maintain a navy.

14. To make rules for the government and regulation of the land and naval forces.

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

16. To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress.

17. To exercise exclusive legislation in all cases whatsoever over such district (not exceeding ten miles square) as may, by cession of particular States and the acceptance of Congress, become the seat of Government of the United States, and to exercise like authority over all places purchased by the consent of the Legislature of the State in which the same shall be, for the erection of forts, magazines, arsenals, dry-docks, and other needful buildings.

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or in any department or officer thereof.

Immigrants, How Admitted.— SECTION IX. 1. The migration or importation of such persons as any of the States now existing shall think proper to admit, shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight, but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person.

Habeas Corpus.— 2. The privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

Attainder. 3. No bill of attainder or ex post facto law shall be passed.

Direct Taxes.— 4. No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

Regulations Regarding Customs Duties.— 5. No tax or duty shall be laid on articles exported from any State.

6. No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another, nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties in another.

Moneys, How Drawn.— 7. No money shall be drawn from the Treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

Titles of Nobility Prohibited.— 8. No title of nobility shall be granted by the United States. And no person holding any office of profit or trust under them shall, without the consent of the Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign state.

Powers of States Defined.— SECTION X. 1. No State shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, ex post facto law, or law impairing the obligation of contracts, or grant any title of nobility.

2. No State, shall, without the consent of the Congress, lay any impost or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts, laid by any State on imports or exports, shall be for the use of the Treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

3. No State shall, without the consent of Congress, lay any duty or tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another State, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

Article II. Executive Power, in Whom

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Vested.—SECTION I. 1. The Executive power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and, together with the Vice-President, chosen for the same term, be elected as follows:

Electors.—2. Each State shall appoint, in such manner as the Legislature thereof may direct, a number of electors, equal to the whole number of Senators and Representatives to which the State may be entitled in the Congress; but no Senator or Representative or person holding an office of trust or profit under the United States shall be appointed an elector.

Proceedings of Electors.—Proceedings of the House of Representatives.—3. The electors shall meet in their respective States and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same State with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each, which list they shall sign and certify, and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes shall be the President, if such number be a majority of the whole number of electors appointed, and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose by ballot one of them for President; and if no person have a majority, then from the five highest on the list the said House shall in like manner choose the President. But in choosing the President, the vote shall be taken by States, the representation from each State having one vote. A quorum, for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. In every case, after the choice of the President, the person having the greatest number of votes of the electors shall be the Vice-President. But if there should remain two or more who have equal votes, the Senate shall choose from them by ballot the Vice-President.*

Time of Choosing Electors.—4. The Congress may determine the time of choosing the electors, and the day on which they shall give their votes, which day shall be the same throughout the United States.

Qualifications of the President.—5. No person except a natural-born citizen, or a citizen of the United States at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years and been fourteen years a resident within the United States.

Provision in Case of His Disability.—6. In case of the removal of the President from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice-President and the Congress may by law provide for the case of removal, death, resignation, or inability, both of the President and Vice-President, declaring what officer shall then act as President, and such officer shall act accordingly, until the disability be removed or a President shall be elected.

Salary of the President.—7. The President shall, at stated times, receive for his services a compensation which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

Oath of the President.—8. Before he enter on the execution of his office he shall take the following oath or affirmation:

'I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States, and will, to the best of my ability, preserve, protect, and defend the Constitution of the United States.'

Duties of the President.—SECTION II. 1. The President shall be Commander-in-Chief of the Army and Navy of the United States, and of the militia of the several States when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offences against the United States except in cases of impeachment.

May Make Treaties, Appoint Ambassadors, Judges, etc.—2. He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators pres-

* This clause is superseded by Article XII, Amendments.

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ent concur; and he shall nominate, and by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may by law vest the appointment of such inferior officers as they think proper in the President alone, in the courts of law, or in the heads of departments.

May Fill Vacancies.— 3. The President shall have power to fill up all vacancies that may happen during the recess of the Senate by granting commissions, which shall expire at the end of their next session.

May Make Recommendations to and Convene Congress.— SECTION III. He shall from time to time give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may, on extraordinary occasions, convene both Houses, or either of them, and in case of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

How Officers May be Removed.— SECTION IV. The President, Vice-President, and all civil officers of the United States shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

Article III. Judicial Power, How Vested.— SECTION I. The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the Supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services a compensation which shall not be diminished during their continuance in office.

To What Cases it Extends.— SECTION II. 1. The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers, and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States; between a State and citizens of another State; between citizens of different States; between citizens of the same State, claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign States, citizens or subjects.

Jurisdiction of the Supreme Court.— 2. In all cases affecting ambassadors, other public ministers, and consuls, and those in which a State shall be party, the Supreme Court shall have original jurisdiction. In all the other cases before-mentioned the Supreme Court shall have appellate jurisdiction, both as to law and fact, with such exceptions and under such regulations as the Congress shall make.

Rules Respecting Trials.— 3. The trial of all crimes, except in cases of impeachment, shall be by jury, and such trial shall be held in the State where the said crimes shall have been committed; but when not committed within any State the trial shall be at such place or places as the Congress may by law have directed.

Treason Defined.— SECTION III. 1. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

How Punished.— 2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attainted.

Article IV. Rights of States and Records.— SECTION I. Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State. And the Congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

Privileges of Citizens.— SECTION II. 1. The citizens of each State shall be entitled to all privileges and immunities of citizens in the several States.

Executive Requisitions.— 2. A person charged in any State with treason, felony, or other crime, who shall flee from justice, and be found in another State, shall, on demand of the Executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

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Laws Regulating Service or Labor.— 3. No person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

New States, How Formed and Admitted.— SECTION III. 1. New States may be admitted by the Congress into this Union, but no new State shall be formed or erected within the jurisdiction of any other State, nor any State be formed by the junction of two or more States, or parts of States, without the consent of the Legislatures of the States concerned, as well as of the Congress.

Power of Congress over Public Lands. —2. The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular State.

Republican Government Guaranteed.— SECTION IV. The United States shall guarantee to every State in this Union a republican form of government, and shall protect each of them against invasion; and, on application of the Legislature, or of the Executive (when the Legislature cannot be convened), against domestic violence.

Article V. Constitution, How Amended. —The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the Legislatures of two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the Legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the Ninth Section of the First Article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

Article VI. Validity of Debts Recognized.— 1. All debts contracted and engagements entered into before the adoption of this Constitution shall be as valid against the United States under this Constitution as under the Confederation.

Supreme Law of the Land Defined.— 2. This Constitution and the laws of the United States which shall be made in pursuance thereof, and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land, and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

Oath: of Whom Required and for What.— 3. The Senators and Representatives before mentioned, and the members of the several State Legislatures, and all executive and judicial officers, both of the United States, and of the several States, shall be bound by oath or affirmation to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

Article VII. Ratification of the Constitution.— The ratification of the Conventions of nine States shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

DONE in Convention by the unanimous consent of the States present the seventeenth day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the Independence of the United States of America the twelfth. In witness whereof we have hereunto subscribed our names,

GO: WASHINGTON,
Presidt. and Deputy from Virginia.

AMENDMENTS TO THE CONSTITUTION

Articles in addition to, and Amendment of, the Constitution of the United States of America, proposed by Congress, and ratified by the Legislatures of the several States, pursuant to the Fifth Article of the original Constitution.

Article I. Religion and Free Speech. —Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances.

Article II. Right to Bear Arms.— A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.

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Article III. Soldiers in Time of Peace.— No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war but in a manner to be prescribed by law.

Article IV. Right of Search.— The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Article V. Capital Crimes and Arrest Therefor.— No person shall be held to answer for a capital or other infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service, in time of war or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

Article VI. Right to Speedy Trial.— In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defence.

Article VII. Trial by Jury.— In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise reëxamined in any court of the United States than according to the rules of the common law.

Article VIII. Excessive Bail.— Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Article IX. Enumeration of Rights. — The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

Article X. Reserved Rights of States. — The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

Article XI. Judicial Power.— The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States, by citizens of another State, or by citizens or subjects of any foreign State.

Article XII. Electors in Presidental Elections.— The electors shall meet in their respective States, and vote by ballot for President and Vice-President, one of whom at least shall not be an inhabitant of the same State with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice-President; and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice-President, and of the number of votes for each, which lists they shall sign and certify, and transmit, sealed, to the seat of the Government of the United States, directed to the President of the Senate; the President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted; the person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such majority, then from the persons having the highest numbers, not exceeding three, on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice-President shall act as President, as in the case of the death or other constitutional disability of the President. The person having the greatest number of votes as Vice-President shall be the Vice-President, if such number be a majority of the whole number of electors appointed, and if no person have a majority, then from the two highest numbers on the list the Senate shall choose the Vice-President; a quorum for

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the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President shall be eligible to that of Vice-President of the United States.

Article XIII. Slavery Prohibited.—1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

2. Congress shall have power to enforce this article by appropriate legislation.

Article XIV. Protection for all Citizens.—1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

Apportionment of Representatives.—2. Representatives shall be apportioned among the several States according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, Representatives in Congress, the executive and judicial officers of a State, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being of twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such State.

Rebellion Against the United States.—3. No person shall be a Senator or Representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any State Legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid and comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each House, remove such disability.

The Public Debt.—4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any State shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

Article XV. Right of Suffrage.—1. The right of the citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color or previous condition of servitude.

2. The Congress shall have power to enforce the provisions of this article by appropriate legislation.

Article XVI. The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment, among the several states, and without regard to any census or enumeration.

Article XVII. The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislatures.

When vacancies happen in the representation of any State in the Senate, the executive authority of such State shall issue writs of election to fill such vacancies, provided that the Legislature of any State may empower the Executive thereof to make temporary appointments until the people fill the vacancies by election as the Legislature may direct.

RATIFICATION OF THE CONSTITUTION.

The Constitution was ratified by the thirteen original States in the following order:

Delaware, December 7, 1787, unanimously.

Pennsylvania, December 12, 1787, vote 46 to 23.

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New Jersey, December 18, 1787, unanimously.
Georgia, January 2, 1788, unanimously.
Connecticut January 9, 1788, vote 128 to 40.
Massachusetts, February 6, 1788, vote 187 to 168.
Maryland, April 28, 1788, vote 63 to 12.
South Carolina, May 23, 1788, vote 149 to 73.
New Hampshire, June 21, 1788, vote 57 to 46.
Virginia, June 25, 1788, vote 89 to 79.
New York, July 26, 1788, vote 30 to 28.
North Carolina November 21, 1789, vote 193 to 75.
Rhode Island, May 29, 1790, vote 34 to 32.

RATIFICATION OF THE AMENDMENTS

I to X inclusive were declared in force December 15, 1791.

XI was declared in force January 8, 1798.

XII regulating elections, was declared in force September 28, 1804.

XIII. The emancipation amendment was proclaimed December 18, 1865.

XIV. Reconstruction amendment was proclaimed July 28, 1868.

XV. Negro citizenship amendment was proclaimed March 30, 1870.

XVI. The income tax amendment became a provision of the Constitution, February 3, 1913.

XVII. Popular election of Senators became a provision of the Constitution, April 8, 1913.

In 1796 George Washington took leave of the people in a famous address. Its concluding portions are here given:

WASHINGTON'S FAREWELL ADDRESS

Here, perhaps, I ought to stop; but a solicitude for your welfare, which cannot end but with my life, and the apprehension of danger natural to that solicitude, urge me, on an occasion like the present, to offer to your solemn contemplation, and to recommend to your frequent review, some sentiments, which are the result of much reflection, of no inconsiderable observation, and which appear to me all-important to the permanency of your felicity as a people. These will be afforded to you with the more freedom, as you can only see in them the disinterested warnings of a parting friend, who can possibly have no personal motive to bias his counsel; nor can I forget, as an encouragement to it, your indulgent reception of my sentiments on a former and not dissimilar occasion. Interwoven as is the love of liberty with every ligament of your hearts, no recommendation of mine is necessary to fortify or confirm the attachment.

The unity of government, which constitutes you one people, is also now dear to you. It is justly so; for it is a main pillar in the edifice of your real independence — the support of your tranquillity at home, your peace abroad, of your safety, of your prosperity, of that very liberty which you so highly prize. But as it is easy to foresee that, from different causes and from different quarters, much pains will be taken, many artifices employed, to weaken in your minds the conviction of this truth; as this is the point in your political fortress against which the batteries of internal and external enemies will be most constantly and actively (though often covertly and insidiously) directed — it is of infinite moment that you should properly estimate the immense value of your national union to your collective and individual happiness; that you should cherish a cordial, habitual and immovable attachment to it; accustoming yourselves to think and speak of it as of the palladium of your political safety and prosperity; watching for its preservation with jealous anxiety; discountenancing whatever may suggest even a suspicion that it can, in any event, be abandoned; and indignantly frowning upon the first dawning of every attempt to alienate any portion of our country from the rest, or to enfeeble the sacred ties which now link together the various parts.

For this you have every inducement of sympathy and interest. Citizens by birth or choice of a common country, that country has a right to concentrate your affections. The name of America, which belongs to you in your national capacity, must always exalt the just pride of patriotism, more than any appellation derived from local discriminations. With slight shades of differences, you have the same religion, manners, habits, and political principles. You have, in a common cause, fought and triumphed together; the independence and liberty you possess are the work of joint counsels and joint efforts, of common dangers, sufferings and successes.

It is important, likewise, that the habits of thinking, in a free country, should inspire caution in those in-

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trusted with its administration, to confine themselves within their respective constitutional spheres, avoiding in the exercise of the powers of one department, to encroach upon another. The spirit of encroachment tends to consolidate the powers of all the departments in one, and thus to create, whatever the form of government, a real despotism. A just estimate of that love of power, and proneness to abuse it which predominates in the human heart, is sufficient to satisfy us of the truth of this position. The necessity of reciprocal checks in the exercise of political power, by dividing and distributing it into different depositories, and constituting each the guardian of the public weal, against invasions by the others, has been evinced by experiments, ancient and modern; some of them in our own country and under our own eyes. To preserve them must be as necessary as to institute them. If, in the opinion of the people, the distribution or modification of the constitutional powers be, in any particular, wrong, let it be corrected by an amendment in the way which the Constitution designates. But let there be no change or usurpation; for though this, in one instance, may be the instrument of good, it is the customary weapon by which free governments are destroyed. The precedent must always greatly overbalance, in permanent evil, and partial or transient benefit, which the use can, at any time yield.

Observe good faith and justice toward all nations; cultivate peace and harmony with all; religion and morality enjoin this conduct; and can it be that good policy does not equally enjoin it? It will be worthy of a free, enlightened, and, at no distant period, a great nation, to give to mankind the magnanimous and too novel example of a people always guided by an exalted justice and benevolence. Who can doubt that, in the course of times and things, the fruits of such a plan would richly repay any temporary advantages which might be lost by a steady adherence to it? Can it be that Providence has not connected the permanent felicity of a nation with its virtue? The experiment, at least, is recommended by every sentiment which ennobles human nature. Alas! is it rendered impossible by its vices?

Against the insidious wiles of foreign influence (I conjure you to believe me, fellow-citizens) the jealousy of a free people ought to constantly awake; since history and experience prove that foreign influence is one of the most baneful foes of republican government. But that jealousy to be useful, must be impartial; else it becomes the instrument of the very influence to be avoided, instead of a defence against it. Excessive partiality for one foreign nation, and excessive dislike for another, cause those whom they actuate to see danger only on one side, and serve to veil, and even second, the arts of influence on the other. Real patriots, who may resist the intrigues of the favorite, are liable to become suspected and odious, while its tools and dupes usurp the applause and confidence of the people, to surrender their interests.

The great rule of conduct for us in regard to foreign nations, is, in extending our commercial relations, to have with them as little political connection as possible. So far as we have already formed engagements, let them be fulfilled with perfect good faith. Here let us stop. Europe has a set of primary interests, which to us have none, or a very remote relation. Hence she must be engaged in frequent controversies, the causes of which are essentially foreign to our concerns. Hence, therefore, it must be unwise in us to implicate ourselves by artificial ties, in the ordinary vicissitudes of her politics, or the ordinary combinations and collision of her friendships or enmities. Our detached and distant situation invites and enables us to pursue a different course. If we remain one people under an efficient government, the period is not far off when we may defy material injury from external annoyance; when we may take such an attitude as will cause the neutrality we may at any time resolve upon, to be scrupulously respected; when belligerent nations, under the impossibility of making acquisitions upon us, will not lightly hazard the giving us provocation; when we may choose peace or war, as our interest, guided by justice, shall counsel.

In offering to you, my countrymen these counsels of an old and affectionate friend, I dare not hope that they will make the strong and lasting impression I could wish; that they will control the usual current of the passions, or prevent our nation from running the course which hitherto has marked the destiny of nations; but if I may even flatter myself that they may be productive of some partial benefit; some occasional good; that they may now and then recur to moderate the fury of party spirit, to warn against the mischiefs of foreign intrigues, to guard against the impostures of pretended patriotism; this hope will be full recompense for the solicitude

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for your welfare by which they have been dictated.

GEORGE WASHINGTON.

United States, September 17, 1796.

Next in order in the series of famous American documents is the 'Monroe Doctrine,' issued in 1823 as part of President Monroe's message to Congress in that year. Spain had long been having trouble with her American colonies and there was serious danger of some of the other nations of Europe giving her aid and receiving American territory in exchange. Russia was also seeking to extend its holdings on the Pacific coast. Under these threatening circumstances Monroe gave warning to all ambitious nations that the United States would not stand idly by and see the southern republics seized by any foreign power. This declaration holds good to-day and has been frequently invoked as a warning to European powers to keep off of American soil. We give below the text of this significant declaration of American policy, the recognized political principle of 'America for the Americans.'

THE MONROE DOCTRINE

In the discussions to which this interest has given rise, and in the arrangements by which they may terminate, the occasion has been deemed proper for asserting, as a principle in which rights and interests of the United States are involved, that the American continents, by the free and independent condition which they have assumed and maintain, are henceforth not to be considered as subjects for future colonization by any European power. . . . We owe it, therefore, to candor and to the amicable relations existing between the United States and those powers to declare that we should consider any attempt on their part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered and shall not interfere. But with the governments who have declared their independence and maintain it, and whose independence we have, on great consideration and on just principles, acknowledged, we could not view any interposition for the purpose of oppressing them or controlling in any other manner their destiny by any European power in any other light than as the manifestation of an unfriendly disposition toward the United States.

Though this doctrine has the weight only of an executive statement, it has been maintained as resolutely as though it were a section of the Constitution, being invoked on several occasions, and especially in that of the occupation of Mexico by France during the American Civil war. European nations have rarely ventured to disregard it, and never successfully.

The most perilous threat against the stability of the Union came in later years, when the great controversy between the advocates of slavery and emancipation arose. It led, as all know, to one of the greatest wars of the nineteenth century, the struggle in the field between the parties which had for years contended on the rostrum. In the midst of this great war President Lincoln issued a proclamation of freedom for the slaves which the event of the war lifted into the category of the great State papers of the United States. Its terms have since been accepted by North and South alike. The text of this proclamation is here given:

THE EMANCIPATION PROCLAMATION

WHEREAS, On the twenty-second day of September, in the year of our Lord one thousand eight hundred and sixty-two, a proclamation was issued by the President of the United States, containing among other things the following, to wit:

'That on the first day of January, in the year of our Lord one thousand eight hundred and sixty-three, all persons held as slaves within any State or designated part of a State, the people whereof shall then be in rebellion against the United States, shall be then, thenceforward, and forever free; and the executive government of the United States, including the military and naval authority thereof, will recognize and maintain the freedom of such persons, and will do no act or acts to repress such persons, or any of them, in any efforts they may make for their actual freedom.

'That the Executive will, on the first day of January aforesaid, by proclamation, designate the States and parts of States, if any, in which the people thereof, respectively, shall then be in rebellion against the United States; and the fact that any State, or the people thereof, shall on that day be in good faith represented in the Congress of the United States, by members chosen thereto at elections wherein a majority of the qualified voters of such State shall have participated, shall, in the absence of strong countervailing testimony,

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be deemed conclusive evidence that such State, and the people thereof, are not then in rebellion against the United States.'

Now, therefore, I, Abraham Lincoln, President of the United States, by virtue of the power in me vested as commander-in-chief of the army and navy of the United States, in time of actual armed rebellion against the authority and government of the United States, and as a fit and necessary war measure for suppressing said rebellion, do, on this first day of January, in the year of our Lord one thousand eight hundred and sixty-three, and in accordance with my purpose so to do, publicly proclaimed for the full period of one hundred days from the day first above mentioned, order and designate as the States and parts of States wherein the people thereof, respectively, are this day in rebellion against the United States, the following, to wit:

Arkansas, Texas, Louisiana (except the Parishes of St. Bernard, Plaquemines, Jefferson, St. John, St. Charles, St. James, Ascension, Assumption, Terre Bonne, Lafourche, St. Mary's, St. Martin and Orleans, including the city of New Orleans), Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina and Virginia (except the forty-eight counties designated as West Virginia, and also the counties of Berkeley, Accomac, Northampton, Elizabeth City, York, Princess Anne and Norfolk, including the cities of Norfolk and Portsmouth); and which excepted parts are, for the present, left precisely as if this proclamation were not issued.

And by virtue of the power, and for the purpose aforesaid, I do order and declare that all persons held as slaves within said designated States, and parts of States, are and henceforward shall be free, and the executive government of the United States, including the military and naval authorities thereof, will recognize and maintain the freedom of said persons.

And I hereby enjoin upon the people so declared to be free to abstain from all violence, unless in necessary self-defence; and I recommend to them that in all cases when allowed, they labor faithfully for reasonable wages.

And I further declare and make known, that such persons, of suitable condition, will be received into the armed service of the United States to garrison forts, positions, stations, and other places, and to man vessels of all sorts in said service.

And upon this act, sincerely believed to be an act of justice, warranted by the Constitution upon military necessity, I invoke the considerate judgment of mankind and the gracious favor of Almighty God.

In witness whereof I have hereunto set my hand and caused the seal of the United States to be affixed. Done at the city of Washington, this first day of January, in the year of our Lord one thousand eight hundred and sixty-three, and of the Independence of the United States of America the eighty-seventh.

ABRAHAM LINCOLN.

One more brief but notable declaration from President Lincoln will suffice to close this series of national documents. It is his address at the dedication of Gettysburg Cemetery, November 19, 1863. It has since been regarded as a prose poem unsurpassed for dignity and pathos in the world's history.

LINCOLN'S GETTYSBURG SPEECH

Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battlefield of that war. We are met to dedicate a portion of it as the final resting-place of those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But in a larger sense we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here have consecrated it far above our power to add or detract. The world will little note nor long remember what we say here but it can never forget what they did here. It is for us, the living, rather to be dedicated here to the unfinished work that they have thus far so nobly carried on. It is rather for us to be here dedicated to the great task remaining before us; that from these honored dead we take increased devotion to the cause for which they here gave the last full measure of devotion; that we here highly resolve that the dead shall not have died in vain; that the nation shall, under God, have a new birth of freedom, and that government of the people, by the people, and

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for the people, shall not perish from the earth.

The political condition of the United States, as it at present stands, is a result of the several stages of governmental evolution above described, and especially of the operation of the Constitution, the basis of the Federal Union of the States. This Constitution embodies the general principles of government adapted to the organisation of such a union, the result being that when particular questions have arisen in the history of the nation, it has frequently become the duty of the Supreme Court to decide on the constitutionality of such questions. Thus numerous acts have been passed by Congress the agreement of which with the Constitution was doubtful. It is not the duty of the Supreme Court to deal with such acts unless a suit is brought by some party or parties to determine their constitutionality, in which case the Supreme Court takes the matter in hand and renders a decision as to whether they are in harmony with the Constitution or the contrary. Such a decision is final and by this means the integrity of the Constitution against discordant acts of Congress is preserved and its exact significance developed. In this way the Supreme Court of the United States has become a great balance wheel by the aid of which the course of government is made to run true. It may be further stated here that the Constitution of the United States differs from that of Great Britain in being a written document, inflexible in its provisions, while that of Great Britain is, properly considered, not a constitution at all, but simply an aggregation of the many acts of Parliament, which is changed or added to by every new Parliamentary measure. The general organization of the Federal republic is as follows: The powers of the national government are of broad and general scope, embracing those subjects that affect the country as a whole or pass beyond the borders of any single State, including the relations of the country to foreign nations and of the States to each other. Under this general governmental organization lie the several States, each a sovereign commonwealth within its own borders and with governmental control over all subjects that relate to itself alone, or to intrastate as distinct from interstate interests. Thus each State has duties of importance belonging to itself, outside of the jurisdiction of the general government, and to deal with these it possesses a governmental organisation formed on the model of the national government. Each State has its Constitution, its Senate and House of Representatives, its Governor (corresponding to the President), its Supreme Court, with duties similar to those of the National Supreme Court, and in all these respects is a copy in miniature of the Federal governmental organisation. It has its own code of laws, which is not operative beyond its borders, and in this way is a little nation in itself, with powers which cannot be abrogated. Tracing down the details of this composite scheme of government we come to the cities, in which in some measure the same type of organisation is preserved, as they have a legislative body of two branches, and a Mayor as their chief executive official. They lack the Supreme Court and their local government is in some measure under State control, but in various respects each is a little sovereignty in itself. This is especially the case in the metropolitan city of New York, the present population of which exceeds that of the remainder of the State, and which has control of local interests of great diversity and importance, in the management of which it has accumulated a municipal debt far greater than that of any State in the Union and surpassed only by the national debt of the country as a whole.

In the development of this great congeries of self-governing units some friction has from time to time arisen, and there has been vigorous discussion of State and National jurisdiction and powers, the result being at present the existence of two great political parties, the Democratic and the Republican, the first standing for State rights, the second favoring a broadening of the National sovereignty. While these parties differ in other particulars, this fundamental distinction has usually been maintained, and since the formation of the government two parties with these general views have existed, at first those of the Federalists and Anti-Federalists, and after them parties with various names, but with this division of views. At present the tendency seems to be towards a widening of the powers of the national government, but it has not escaped vigorous opposition from the adherents of the States rights doctrine. There has also recently been developed a degree of friction between the executive and the legislative branches of the general government, the executive in some respects trenching upon the functions of the legislative and this vigorously maintaining its rights and privileges. There has also been manifested a tendency to bring the

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great business organizations of the country within some considerable degree of governmental control, under the plea that their vast growth and power has made them inimical to the rights of the public at large and that it is the duty of the government to act as guardian of the industrial rights of the people.

With this brief review of the status of governmental and industrial affairs now existing within the United States it will be of interest to consider in some measure the workings of the great Federal organization here outlined. In the preceding article, on the subject of the United States in general, the organization of the government under the Constitution is stated, and in the Constitution itself, as above given, may be found the clauses which define this organization. But in the working of the government machinery several adventitious departments have arisen, some account of which is necessary before the operation of the governmental organization can be properly understood. This has principally to do with the great executive departments of the government, the series of officials who compose the cabinet of the President, but who were not provided for in the Constitution, having arisen through the multiplicity of executive labors.

It was quickly perceived, in fact, that the duties of the executive branch of the government were too varied and numerous for management and control by any one official, and at the start President Washington was obliged to call several persons to his aid, the so-called cabinet officers, at first consisting of the Secretaries of State, of War, and of the Treasury, and the Attorney-General, appointed in 1789. These had no official standing under the government, but were simply aids to the President, chosen by him and removable at his will, yet indispensable to the multitudinous duties arising in the conduct of public affairs. This continues the position of these officials to the present day, in which they form the President's official family and body of advisers, but possess no power beyond that which the President chooses to give them and whose advice he is in no respect obliged to take. From time to time it became advisable to add other officials to the four above named. The Postmaster-General was at first looked upon as a temporary position only, and did not become permanent until 1794, and this official was not considered a Cabinet officer until 1829. The Secretary of the Navy was added to the list in 1798. The later additions to the list were those of Secretary of the Interior in 1849, Secretary of Agriculture in 1889, and Secretary of Commerce in 1903, and Secretary of Labor in 1913. Under each of these officials there are assistants and a considerable number of division and other officers, the scope of departmental work having grown wide and its duties numerous and complicated as time went on and the country grew in population and wealth. Members of the Cabinet receive salaries of $12,000 a year. The duties of the several heads of departments are as follows:

Duties of the Secretary of State.— The Secretary of State is charged, under the direction of the President, with the duties appertaining to correspondence with the public ministers and the consuls of the United States, and with the representatives of foreign powers accredited to the United States; and to negotiations of whatever character relating to the foreign affairs of the United States. He is the medium of correspondence between the President and the chief executives of the several States of the United States; he has the custody of the Great Seal of the United States, and countersigns and affixes such seal to all executive proclamations, to various commissions, and to warrants for the extradition of fugitives from justice. He is regarded as the first in rank among the members of the Cabinet. He is the custodian of the treaties made with foreign states, and of the laws of the United States. He grants and issues passports, and exequaturs to foreign consuls in the United States are issued through his office. He publishes the laws and resolutions of Congress, amendments to the Constitution, and proclamations declaring the admission of new States into the Union.

Duties of the Secretary of the Treasury.— The Secretary of the Treasury is charged by law with the management of the national finances. He prepares plans for the improvement of the revenue and for the support of the public credit; superintends the collection of the revenue, and directs the forms of keeping and rendering public accounts and of making returns; grants warrants for all moneys drawn from the treasury in pursuance of appropriations made by law, and for the payment of moneys into the treasury; and annually submits to Congress estimates of the probable revenues and disbursements of the government. He also controls the construction of public buildings; the coinage and printing of money; the administration of the life-saving, revenue-cutter and the public

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health and marine-hospital branches of the public service, and furnishes generally such information as may be required by either branch of Congress on all matters pertaining to the foregoing.

Duties of the Secretary of War.— The Secretary of War is head of the War Department, and performs such duties as are required of him by law or may be enjoined upon him by the President concerning the military service. He is charged by law with the supervision of all estimates of appropriations for the expenses of the department, including the military establishments; of all purchases of army supplies; of all expenditures for the support, transportation and maintenance of the army, and of such expenditures of a civil nature as may be placed by Congress under his direction. He also has supervision of the United States Military Academy at West Point and of military education in the army, of the Board of Ordnance and Fortification, of the various battlefield commissions, and of the publication of the Official Records of the War of the Rebellion. He has charge of all matters relating to national defense and seacoast fortifications, army ordnance, river and harbor improvements, the prevention of obstruction to navigation, and the establishment of harbor lines; and all plans and locations of bridges authorized by Congress to be constructed over the navigable waters of the United States require his approval. He also has charge of the establishment or abandonment of military posts, and of all matters relating to leases, revocable licenses, and all other privileges upon lands under the control of the War Department.

Duties of the Attorney-General.— The Attorney-General is the head of the Department of Justice and the chief law officer of the government. He represents the United States in matters involving legal questions; he gives his advice and opinion, when they are required by the President or by the heads of the other Executive Departments, on questions of law arising in the administration of their respective departments; he appears in the Supreme Court of the United States in cases of especial gravity and importance; he exercises a general superintendence and direction over United States attorneys and marshals in all judicial districts in the States and territories; and he provides special counsel for the United States whenever required by any department of the government.

Duties of the Postmaster-General.— The Postmaster-General has the direction and management of the Post-Office Department. He appoints all officers and employees of the department, except the four Assistant Postmasters-General and the purchasing agent, who are appointed by the President, by and with the advice and consent of the Senate; appoints all postmasters whose compensation does not exceed $1,000; makes postal treaties with foreign governments, by and with the advice and consent of the President; awards and executes contracts, and directs the management of the domestic and foreign mail service.

Duties of the Secretary of the Navy. — The Secretary of the Navy performs such duties as the President of the United States, who is Commander-in-Chief, may assign him, and has the general superintendence of construction, manning, armament, equipment and employment of vessels of war.

Duties of the Secretary of the Interior. — The Secretary of the Interior is charged with the supervision of public business relating to patents for inventions; pensions and bounty lands; the public lands and surveys; the Indians; education; the Geological Survey and Reclamation Service; the Hot Springs Reservation, Arkansas; Yellowstone National Park, Wyoming and the Yosemite, Sequoia, and General Grant parks, California, and other national parks; distribution of appropriations for agricultural and mechanical colleges in the States and territories; and supervision of certain hospitals and eleemosynary institutions in the District of Columbia. He also exercises certain powers and duties in relation to the territories of the United States.

Duties of the Secretary of Agriculture. — The Secretary of Agriculture exercises personal supervision of public business relating to the agricultural industry. He appoints all the officers and employees of the department with the exception of the Assistant Secretary and the Chief of the Weather Bureau, who are appointed by the President, and directs the management of all the bureaus, divisions, offices, and the Forest Service, embraced in the department. He exercises advisory supervision over agricultural experiment stations, which receive aid from the National Treasury; has control of the quarantine stations for imported cattle, of interstate quarantine rendered necessary by sheep and cattle diseases, and of the inspection of cattle-carrying vessels; and directs the inspection of domestic and imported food products under the meat inspection and pure food and drugs laws. He is charged with the duty of

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issuing rules and regulations for the protection, maintenance, and care of the National Forest Reserves. He also is charged with carrying into effect the laws prohibiting the transportation by interstate commerce of game killed in violation of local laws and excluding from importation certain noxious animals, and has authority to control the importation of other animals.

Duties of the Secretary of Commerce.—The Secretary of Commerce and Labor is charged with the work of promoting the commerce of the United States, and its mining, manufacturing, shipping, fishery and transportation interests. His duties also comprise the investigation of the organization and management of corporations (excepting railroads) engaged in interstate commerce; the administration of the Lighthouse Service, and the aid and protection to shipping thereby; the taking of the census, and the collection and publication of statistical information connected therewith; the making of coast and geodetic surveys; the collecting of statistics relating to foreign and domestic commerce; the inspection of steamboats, and the enforcement of laws relating thereto for the protection of life and property; the supervision of the fisheries as administered by the Federal Government; the supervision and control of the Alaskan fur seal, salmon and other fisheries; the jurisdiction over merchant vessels, their registry, licensing, measurement entry, clearance, transfers, movement of their cargoes, and passengers, and laws relating thereto, and to seamen of the United States; the supervision of the immigration of aliens, and the enforcement of the laws relating thereto, and to the exclusion of Chinese; the custody, construction, maintenance and application of standards of weights and measurements; and the gathering and supplying of information regarding industries and markets for the fostering of manufacturing. He has power to call upon other departments for statistical data obtained by them.

It is his further duty to make such special investigations and furnish such information to the President or Congress as may be required by them on the foregoing subject-matters and to make annual reports to Congress upon the work of said department.

Duties of the Secretary of Labor.—The Secretary of Labor is charged with fostering, promoting and developing the welfare of the wage-earners of the United States; improving their working conditions and advancing their opportunities for profitable employment. He has power to act as mediator and to appoint commissioners of conciliation in labor disputes whenever in his judgment the interests of industrial peace may require it to be done. Further, he is vested with authority over any bureau, office, officer, board, branch or division of public service included in the Department of Labor.

The act creating the Department of Labor, approved March 4, 1913, changed the name of the Department of Commerce and Labor to the Department of Commerce. The Bureau of Labor, Bureau of Immigration, Division of Naturalization and Children's Bureau were organized into this new department.

The Army of the United States at the beginning of the second year of America's entrance into the European war (1918) had a strength of 1,500,000 men. The Army and Navy pay is as per table:

Army Pay Table.

Grade.	Pay of officers in active service.—Yearly pay.				
	First 5 years' service.	After 5 years' service.	After 10 years' service.	After 15 years' service.	After 20 years' service.
		10 p. c.	20 p. c.	30 p. c.	40 p. c.
Lieutenant-General	$11,000	.....	.....	.....	.....
Major-General	8,000	.....	.....	.....	.....
Brigadier-General	6,000	.....	.....	.....	.....
Colonel (*b*)	4,000	$4,400	$4,800	$5,000	$5,000
Lieutenant-Colonel (*b*)	3,500	3,850	4,200	4,500	4,500
Major (*b*)	3,000	3,300	3,600	3,900	4,000
Captain	2,400	2,640	2,880	3,120	3,360
First Lieutenant	2,000	2,200	2,400	2,600	2,800
Second Lieutenant	1,700	1,870	2,040	2,210	2,380

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Chaplains have the rank and pay of major, captain and first lieutenant, respectively.

Grade.	PAY OF RETIRED OFFICERS.—Yearly pay.				
	First 5 years' service.	After 5 years' service.	After 10 years' service.	After 15 years' service.	After 20 years' service.
Lieutenant-General	$8,250	.....	.....	.....	.....
Major-General	6,000	.....	.....	.....	.....
Brigadier-General	4,500	.....	.....	.....	.....
Colonel (b)	3,000	$3,300.00	$3,600	$3,750 00	$3,750
Lieutenant-Colonel (b)	2,625	2,887.50	3,150	3,375.00	3,375
Major (b)	2,250	2,475.00	2,700	2,924.40	3,000
Captain	1,800	1,980.00	2,160	2,340.00	2,520
First Lieutenant	1,500	1,650.00	1,800	1,950.00	2,100
Second Lieutenant	1,275	1,402.50	1,530	1,657.44	1,785

(a) Service increase of pay of officers below rank of brigadier-general cannot exceed 40 per cent. in all.

(b) The maximum pay of a colonel is $5000, of a lieutenant-colonel $4500, and of a major $4000.

$24, an increase of $12; over $24, and less than $45, an increase of $8; and those whose base pay is $45 or more per month, an increase of $6 per month.

First-class seamen receive $38.40 per month; seamen gunners, $36.60; firemen, first class, $46.50; musicians, first class, $43.20; second-class seamen, $35.00; third-class seamen, $32.60. First-class

Navy Pay Table.

Rank.	At Sea.	On Shore Duty.	Rank.	At Sea.	On Shore Duty.
Admiral	$14,850	$13,500	Midshipmen (after graduation)	$1,400	$1,400
Rear-Admirals, first 9	8,800	8,000	Mates	1,500	1,125
Rear-Admirals, second nine	6,600	6,000	Medical and Pay Directors and Inspectors having the same rank at sea	4,400	4,000
Brigad'r-General, Commandant Marine Corps	6,600	6,000	Fleet-Surgeons and Fleet-Paymasters	4,400	4,000
Captains	4,400	4,000	Surgeons and Paymasters	3,800	3,000
Commanders	3,850	3,500	Chaplains	2,200 to 4,400	2,000 to 4,000
Lieutenant-Commanders	3,300	3,000	Professors and Civil Engineers	2,640 to 4,400	2,400 to 4,000
Lieutenants	2,640	2,400	Naval Constructors	2,640 to 4,400	2,400 to 4,000
Lieutenants (Junior Grade)	2,200	2,000			
Ensigns	1,870	1,700			
Chief Boatswains, Chief Gunners, Ch'f Carpenters, Chief Sail-makers	1,870	1,700			
Midshipmen (at Naval Academy)	600	600			

The pay of non-commissioned officers is from $40.20 to $96 per month, and of privates from $33 to $36.60 per month.

The Act of Congress of May 22, 1917, provided that commencing June 1, 1917, and continuing until six months after the war, all enlisted men of the navy of the United States whose base pay does not exceed $21 per month shall receive an increase of $15 per month; those whose base pay is over $21, and not exceeding

petty officers receive from $47.60 to $77.50; second-class, from $46.50 to $52; third-class, $41. Chief petty officers receive from $61 to $83 per month, present war pay. In the messmen branch attendants receive from $32.60 to $41; cooks from $41 to $61; stewards to commanders in chief and commandants, $72; cabin and wardroom stewards, $61; other stewards, $46.50.

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Hospital apprentices receive from $20.90 to $26.40 per mouth; pharmacists' mates, from $38.50 to $44; chief pharmacists' mates, acting appointment, $66; chief pharmacists' mates, permanent appointment, $77 per month.

The organization of the legislative branch of the government is as follows:

The Senate.— Two Senators are elected by the legislature of each State for terms of six years each. Each Senator must be thirty years or over of age, and must have been for at least nine years a citizen of the United States. He must be a citizen of the State from which he is chosen, and cannot, while in the Senate, hold any civil position under the government nor act as a Presidential elector. He is elected in the following manner: The election takes place on the second Tuesday after the organization of the legislature chosen next before the expiration of the preceding senatorial term. In each house of the legislature the members present, by a viva voce vote, the name of a person or persons for Senator, and the name of the person receiving the greatest number of votes is entered upon the journal of that house. At noon on the next day the members of both houses meet in a joint session, at which the journals of the two bodies are read, and if the same person received a majority of the votes in both houses he is declared elected Senator. However, if no person receives such majorities, the members in joint session proceed by a viva voce vote to choose a Senator, a majority of all the members being necessary for an election. If such a majority is not secured at the first session, the two houses meet jointly at noon on each succeeding legislative day and take at least one ballot for Senator until one is elected or the legislature adjourns. If a vacancy in the representation of any State in the Senate occurs by reason of death or otherwise, such vacancy is filled by the legislature in the same manner as a Senator is regularly elected. But if such vacancy should occur during a recess of the legislature, or if the legislature should adjourn without electing a Senator, the governor of such State may fill the vacancy by a temporary appointment until a Senator is elected at the next session of the legislature. This method has been varied in one important particular since the passage in 1913 of the XVII amendment to the Constitution; Senators being now chosen by direct vote of the people. This important function is thus taken from the legislature.

House of Representatives.—The House of Representatives is composed of members chosen each two years by the people of the several States. The number of members depend upon the population of the States, each one representing a fixed number of inhabitants, varying after each census. As fixed under the 1910 census the total number of members is 436, including three from the new States of Arizona and New Mexico, admitted in 1912, there being one for each 211,877 of population.

Qualifications.—A Representative must have attained to the age of twenty-five years and have been seven years a citizen of the United States. He must be an inhabitant of the State from which he is chosen and cannot hold any civil office under the United States during his term of office nor serve as a Presidential Elector. By custom he is a resident of the district from which he is chosen.

Election.— The number of Representatives to which each State is entitled is determined by Congress after each decennial census. Congress has fixed the time of their election as the 'Tuesday next after the first Monday in November' in every even-numbered year. In States entitled to more than one Representative, they are elected by 'districts composed of contiguous territory and containing as nearly as possible an equal number of inhabitants,' which districts are determined and the boundaries fixed by the legislatures of the States. When, in a reapportionment, a State's representation is increased, the additional Representatives are chosen by vote of the whole State, until the State is redistricted. They are called Representatives or Congressmen-at-Large.

Judicial Branch of the Government.— The judicial power of the United States is vested in a Supreme Court, nine Circuit Courts, nine Circuit Courts of Appeal, eighty-six District Courts, and a Court of Claims. Judges of the United States courts are appointed by the President with the consent of the Senate and serve during good behavior.

The Supreme Court is composed of a Chief Justice, and eight Associate Justices. The court sits at Washington, and holds one session annually, commencing on the second Monday in October.

The United States is divided into nine judicial circuits. To each circuit the Supreme Court allots one of its justices, who must attend at least one term of such court in every two years. For each circuit there are also appointed two or more circuit judges. The Circuit Court sits twice a year in each district within the circuit.

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The Circuit Courts of Appeal are nine in number and were created for the purpose of relieving the Supreme Court of certain classes of appeals. A Circuit Court of Appeals consists of three judges, two of whom form a quorum. It is held by the justice of the Supreme Court allotted to that circuit and two circuit judges, but a district judge is also competent to act. No judge, however, can hear a case in the Circuit Court of Appeal at the trial of which he presided in the District or Circuit Court.

Congress has set apart each State as a judicial district, except in case of the more populous States, which are divided into two or more districts. There are eighty-six judicial districts in the States and territories. There are one or more resident judges in each district and the court is held by a district judge.

The Court of Claims consists of a Chief Justice and four Associate Judges.

The State governments are organized in the following manner:

The Executive Department.— At the head of this department is the Governor, elected by the people, for a term of one to four years. It is his duty to see that the laws are executed. He may call to his assistance judges and sheriffs and, in case of need, the militia of the State. When public business is conducted with another State, the Governor acts in the name of the State. He sends a message to the legislature at the opening of its session, informing it of the conditions throughout the State, and in time of pressing need may call the legislature in extra session.

In many States the Governor has the power to pardon criminals, or commute their punishment. He appoints many officers and in some States he appoints the judges of the State courts. Most of the States elect a Lieutenant-Governor to serve when the Governor is unable to be at his post. He acts as the President of the State Senate. The Secretary of State, sometimes elected, sometimes appointed by the Governor, is the highest clerk of the executive department. The State Comptroller or Auditor manages the financial business of the State government. The State Treasurer is the custodian of the funds of the State, which he disburses only on orders from the officers designated by law. The Attorney-General is the law officer of the State. The Superintendent of Public Instruction is the head of the school system of the State.

In addition to these officers, which are found in almost every State there are in many States other executive officers and boards whose duties are very important, such as the Insurance Commissioner, the Board of Railroad Commissioners, the Inspector of Factories, the Liquor License Commissioners, the Board of Charities, the Board of Health, the Tax Commissioner, the Board of Pardons, the Superintendent of Banks, the Board of Medical Examiners, the Commissioner of Agriculture and the Board of Public Works.

The Legislative Department.— The legislature of a State is always divided into two branches — a Senate and a House of Representatives. In some States the lower house is called the Assembly, in others the House of Delegates, in New Jersey the General Assembly. In many of the States the whole legislature is called the General Assembly. Both the Senate and the lower house are representative bodies. The counties or towns and cities are represented in the lower house according to population, determined by a census taken every five or ten years. The State is divided into senatorial districts from each of which a senator is elected. The minimum age for senators is generally higher than for representatives, and their term is usually longer.

The State legislature may not pass any law contrary to the Constitution of the State nor of the United States. It grants charters for the government of cities, boroughs and villages; and for the organization of railroad companies, banks, colleges, and many other public and private institutions. It makes laws governing the public schools. It defines the boundaries of counties and towns. It makes laws concerning property, real and personal. It makes laws concerning the social relations, marriages, divorces, etc. It makes laws regulating the manner of holding elections and the qualifications of voters. It regulates railroads, and other public utilities operating within the State. It regulates manufacturing, trading, mining, agriculture, hunting, fishing, etc.

The Judicial Department.— The lowest court is conducted by a justice of the peace or magistrate, who acts in the name of the State. He renders decisions only in small and unimportant cases. The next court is called the Circuit Court, the District Court, the Superior Court, the Supreme Court, or the Court of Common Pleas. This court sits in the courthouse at the county seat. The same judge may serve in several counties. The judges are generally elected, but in some States appointed

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by the Governor. Appeals from the lower court are taken to the Supreme Court, or Court of Appeals, the highest court of the State. It usually meets at the capital of the State. In some States there is an intermediate court between the lower and higher, which hears appeals in certain classes of cases.

The District of Columbia.— The municipal government of the District of Columbia is vested by act of Congress approved June 11, 1878, in three Commissioners, two of whom are appointed by the President from citizens of the District having had three years' residence therein immediately preceding that appointment, and confirmed by the Senate. The other Commissioner is detailed by the President of the United States from the Corps of Engineers of the United States Army, and must have lineal rank senior to captain, or be a captain who has served at least fifteen years in the Corps of Engineers of the Army. The Commissioners appoint the subordinate official service of said government, except the Board of Education, which is appointed by the Supreme Court of the District of Columbia.

County Government.— Every State and territory is divided into counties (in Louisiana called parishes). In the Southern States and in many of the Western States the county — outside of towns and cities — assumes most of the functions of local government. Each county has a county seat where the public business is transacted. Most of this business is done by a Board of County Commissioners or Supervisors, called in some States the county court; in others the levy court, because it levies the taxes. There are no County Commissioners in Rhode Island.

As a rule the County Commissioners fix the rate of taxation for the county, appropriate money for the payment of the salaries of county officers and to meet the other expenses of county government, make contracts for building and repairing roads and bridges, appoint subordinate county officials, and represent the county in the courts when it is sued for damages.

At every county seat one or more judges sit for the trial of cases. These judges are generally State officers, but they receive the assistance of several county officers. The Sheriff carries out the orders of the judge. He has the custody of prisoners, executes the death penalty, sells property and preserves peace and order. When necessary he may call to his aid deputies or helpers. The Prosecuting Attorney, called also the State's Attorney, the District Attorney, the County Attorney, or the Solicitor, appears in the county court and presents the case against a criminal. The Coroner takes charge of the body of a person found dead or who dies mysteriously, and inquires into the cause of death. If foul play is suspected, he impanels a jury and holds an 'inquest.' In some States in case of a vacancy by death, resignation or inability to act of the sheriff he assumes the duties of that office. The Clerk of the County Court or Prothonotary keeps the records of the county court. In some States he keeps a record of deeds and mortgages, issues marriage certificates and records births and deaths.

The above officers are found in almost every State; in many States there are also a County Treasurer, County Auditor, County Assessors, County Tax Collectors, Register or Recorder of Deeds and Superintendent of Schools.

The Probate or Orphans' Court.— In Georgia the judge of this court is called 'Ordinary'; in New York and New Jersey 'Surrogate.'

Township Government.— In the Middle Atlantic and Middle Western States, township government is organized. It usually supports public schools, cares for public roads, and helps the poor. In many States it levies and collects taxes for these purposes. The township officers vary greatly in different states. The more usual ones are the Supervisor or Trustee, who cares for roads and bridges; the School Directors, who control the public schools; the Township Clerk, the Assessors, the Tax Collector, the Auditors, the Constable, who assists the justice of the peace and is the peace officer of the township, and the Overseers of the Poor.

Town Government.— The town as a political organization is characteristic of the New England States. It corresponds in effect to the townships elsewhere, being partly rural, and containing villages, all combined into one political group. Its most important feature is the town-meeting, composed of all citizens and usually held once a year in the town hall. At this meeting the rate of taxation is fixed, money is appropriated, by-laws are passed, and town officers are elected. The principal officers are: The Selectmen, who carry into effect the measures adopted at the town meeting; the Town-clerk, who keeps the records; the Assessors; the Tax-collector; the Town-treasurer; the Overseers of the Poor; the Constable; the Surveyor of Highways, who keeps roads and

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bridges in repair; the Fence-viewers, who settle disputes over boundaries, and the Field-driver, or Pound-keeper, who takes charge of stray animals.

Village or Borough Government.— In thickly settled communities a village or borough may be organized under a charter from the State. It usually has a President or Mayor or Chief Burgess and a body of Trustees, Commissioners, Councilmen or Burgesses, who pass local laws or ordinances, levy taxes, and provide for police and fire protection, street paving, sewerage, etc.; and School Directors, who provide for the needs of the schools. It may also have a Clerk, a Treasurer, Assessors, a Tax Collector, a Constable and a Street Commissioner.

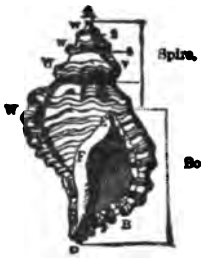
City Government.— When the village or borough grows to a large size, it becomes a city; it is still organized under a charter from the State, but with broader functions and greater powers. The city always has two departments — executive and legislative — the judicial department being a part of the State government.

The Mayor is the executive officer of the city. His powers and functions vary greatly. He is nearly always elected by the people, but in a few cases is chosen by the City Council. His term of office varies from one to four years. His chief duty is to carry out the ordinances of the Council. In most cities he can veto an ordinance, but it can be passed over his veto by a two-thirds or three-fourths vote.

The City Council is the legislative department of the city. In large cities it often has two branches, whose members are called Aldermen and Councilmen, or Select and Common Councilmen. These members are usually elected by wards. They meet in the city hall and make laws, called ordinances, for the government of the city. Their powers and limitations are defined by the State legislature.

The Commission Plan.—In many cities of the country, more than 300 in number, the 'Commission' plan of city government has been adopted. The commission consists of a Mayor and a small body of Councilmen or Aldermen, each the head of a department, and all elected by the whole body of voters without regard to wards or precincts and usually without regard to party. The commission both makes the laws and executes them. The Mayor is chairman of the commission but does not have the veto power.

Univalve (ū'ni-valv), a mollusc with a shell composed of a single piece. The univalves include most of the Gasteropoda, as land-snails, sea-snails, whelks, limpets, etc. The majority of univalve shells are cone-shaped and spiral.



UNIVALVE SHELL OF *Buccinum undatum*.

A, Apex. B, Base. C, Aperture. D, Anterior canal. E, Posterior canal. F, Inner lip, pillar lip, columellar lip or labium. G, Outer lip or labrum. D F E G, Peristome or margin of aperture. W, Whorls or volutions. S, Sutures, or lines of separation. V, Varix. —The last whorl of the shell, usually much larger than the rest, is called the 'body whorl,' the rest of the volutions constitute the 'spire.'

Universalist (ū-ni-ver'sal-ist), a Christian sect which according to the 'profession of belief' as adopted in 1803, at Winchester, New Hampshire, by the New England Convention, believes in the Holy Scriptures; in one God, whose nature is love, revealed in one Lord Jesus Christ, by one Holy Spirit of Grace, who will finally restore the whole family of mankind to holiness and happiness; that believers ought to be careful to maintain order and practice good works, as holiness and true happiness are inseparably connected. The system of government is a modified Presbyterianism. The general convention, held annually, consists of clerical and lay delegates from each State convention. There are in the United States about 900 churches and 55,000 members.

Universal Language, a language invented to serve as a medium of commercial communication for all countries, with the possibility of its eventually superseding all existing languages. Such languages have been partly or fully worked out at various times, as by Urquhart, Dalgarno, Wilkins, Leibnitz, and various others in the past, and in Volapük and Esperanto of recent times. Vigorous efforts have been made to get these two artificial languages adopted, but as yet with little prospect of success. *Pigeon English* and the *Lingua Franca* of the Mediterranean

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are partial and spontaneous efforts in the same direction.

Universal Prime Meridian, in astronomy, the meridian of Greenwich, adopted at an international conference of scientific men, held at Washington, D. C., in 1883. While adopted by the other principal countries, it was not adopted by France until 1911, but is now in use throughout Europe and the United States. Universal time, for international purposes, was adopted at the conference above named. It is reckoned from mean noon at the Universal Prime Meridian, the day commencing at midnight, and being divided into 24 (instead of into two portions of 12) hours each.

University (ū-ni-ver'si-ti), a corporate body or corporation established for the purposes of instruction in all or some of the most important branches of literature and science, and having the power of conferring certain honorary dignities, termed *degrees*, in several faculties, as arts, medicine, law, theology and others. In most cases the corporations constituting universities include a body of teachers or professors for giving instruction to students; but this is not absolutely essential to a university, the staff of London University, for instance, being merely an examining body. In the middle ages, when the term began to be used in reference to seminaries of learning, it denoted either the whole body of teachers and learners, or the whole body of learners, with corporate rights and under by-laws of their own, divided either according to the faculty to which they were attached, or according to the country to which they belonged (hence the 'nations' into which the students were classed, and which still exist in some universities). At a later period the expression *universitas literarum* (the whole of literature or learning), was used to indicate that all the most important branches of knowledge were to be taught in these establishments. Some, forming their notion of a university from the universities of Oxford and Cambridge, suppose that it necessarily means a collection and union of colleges, that it is a great corporation embodying in one certain smaller and subordinate collegiate bodies; but this is not correct, for many universities exist in which there are no colleges. The oldest of the European universities were those of Bologna and Paris, and these formed the models on which most of the other early universities were established, a papal bull being generally regarded as necessary to this. The United States possesses the largest number of institutions bearing the name of universities, but a large proportion are sectarian, and may represent only a single faculty, and in no proper sense deserve the name. For the chief universities see under separate heads, and refer to the articles on the different countries.

University College, a college or teaching institution belonging to a university, or such as might belong to a university. The University College, London, is closely connected with London University. (See *London, University of.*) The name is given especially to three of the four colleges which are intended to form a Welsh University, viz. the *University College of Wales* at Aberystwith, *University College of South Wales* at Cardiff, and the *University College of North Wales* at Bangor. The students of these colleges, proceeding to degrees, have to go through a course at either London, Dublin, Edinburgh, or Glasgow. The University College of Oxford is the oldest of its colleges, founded about 1253.

University Extension, a movement in progress to extend the means of higher education to persons of all classes and of both sexes engaged in the regular occupations of life. Any community may avail itself of the privileges by forming a local committee, which provides the necessary funds and fixes fees, etc. The mode of instruction consists in courses of lectures by specialist graduates of the universities, each lecture being preceded or followed by a class, in which the students are orally examined by the lecturer, who also corrects written papers done at home. An examination is held at the end of each course and certificates awarded. The movement began in 1872 with Cambridge University, but Oxford did not go heartily into it till 1885. The movement has extended widely in Britain and in 1890 reached the United States, where there has developed a liberally conducted movement for university extension, spreading from Philadelphia as a center to many sections of the country, being established mainly in connection with colleges and universities. A well-developed plan has been evolved by which institutions of learning in every section are enabled to share in the benefits of the movement and to extend them to others.

University Settlements, houses in the poor districts of cities where educated men and women live and come in contact with the poorer classes for social

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educational and civic purposes. These settlements provide clubs, and offer a home and recreation for poor workers. Children are taken care of and have many amusements, all with a view to waken in them a desire for better things and right living. The first settlement in the United States was founded in New York city September 1, 1889, by the graduates of several women's colleges. It has since extended to all the large cities of the country, Hull House, Chicago, opened in the same month with the New York settlement, being one of the most notable examples.

Unterwalden (ön'ter-väl-den), a Swiss canton, bounded on the north by the Vierwaldstätter Lake, on the east by mountains which separate it from Uri, on the south by Bern, and on the west by Lucerne; area, 295 sq. miles. It is divided into two valleys, Upper and Lower (Obwalden and Nidwalden), by a forest called Kernwald, and these districts being also politically distinct, send each one representative to the Swiss Council. The chief town of Obwald is Sarnen, and of Nidwald, Stanz. Pop. 28,000. Both cantons are almost entirely Roman Catholic.

Unyoro (ö-nyö'rō), a district of Equatorial Africa, lying to the west and north of Uganda, to which it is tributary, and stretching to the Nile.

Upanishads (ö-pan'i-shad), in Sanskrit literature, a name given to a series of treatises or commentaries on the Vedic hymns, the contents of which are partly ritualistic, partly speculative. They are of different dates, some of them being as old as several centuries B.C.

Upas Tree (*Antiaris toxicaria*).

Upas (ū'pas), a tree common in the forests of Java, and of some of the neighboring islands, and found also in tropical Africa. It is a species of the genus *Antiaris* (*A. toxicaria*), nat. order Artocarpaceæ. Many exaggerated stories were formerly current concerning the deadly properties of this plant, its exhalations being said to be fatal to both animal and vegetable life at several miles distance from the tree itself. The truth is, that the upas is a tree which yields a poisonous secretion and nothing more.

Upernivik (ö-per'ne-vik), the most northerly of the Danish settlements in Greenland, on an island off the west coast, in lat. 72° 48′ N. It has long been a place of call for arctic expeditions.

Upholsterer-bee. See *Carpenter-bee.*

Upolu (ö-pō-lö'), the chief of the Samoan group of islands in the South Pacific. It is about 150 miles in circumference, and cotton and cocoa-nut oil are its principal products. Apia is the capital. It belongs to Germany. Pop. 19,842.

Upper Senegal-Niger, an inland colony in French West Africa, formed in 1894 out of the territories of Senegambia and the Niger, with the exception of the former Senegal protectorate, which was restored to Senegambia. In 1907 the several Dahomey districts were added to the colony, which now has an area of 302,136 sq. miles. Capital, Bamaka; pop. 5,000,000.

Upsala (up-sä'lä), a town of Sweden, 45 miles N. W. of Stockholm. It has a cathedral (archiepiscopal, the finest in Sweden), which contains the tombs of some Swedish kings and of Linnæus; a celebrated university founded in 1477, with a library of about 250,000 volumes, a botanical garden, observatory, etc. Pop. 22,855.

Upshur (up'shur), ABEL PARKER, statesman, born in Northampton Co., Virginia, in 1790. In 1841 he was appointed Secretary of the Navy by President Tyler. Two years later, on the resignation of Daniel Webster, he was appointed Secretary of State. Early in 1844 he was on the United States steamer *Princeton*, on the Potomac River, in company with the President and other members of the cabinet, to witness experiments with a large wrought-iron gun which burst, and mortally wounded him together with several others. He died near Washington, February 28, 1844.

Up'upa. See *Hoopoe.*

Uræmia (ū-rē'mi-a), a diseased condition of the body arising from the presence of urea in the blood, in consequence of the urine not being

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properly secreted, as in Bright's disease or other ailments, thus leaving in the blood elements that should be carried off.

Ural (ū'ral), a river of Russia, which rises in the Ural Mountains, forms part of the boundary between Europe and Asia, and enters the Caspian after a course of about 1000 miles.

Ural Mountains, a series of mountains and plateaus stretching nearly north and south between Europe and Asia, from the shores of the Arctic Ocean for a distance of about 1900 miles; highest summit, 5513 feet. There is but little striking scenery, and the rise is so gradual in some parts that the traveler from Perm to Ekaterinburg, for instance, hardly notices that he has crossed the chain. The Ural Mountains are celebrated for the mines of gold, platinum, copper, coal and iron which they contain, and in the south are many broad valleys of remarkable fertility.

Uralsk (ö-ralsk'), a town of Russia, on the Ural, 170 miles w. s. w. of Orenburg. It has a considerable trade, especially in fish and caviare. Pop. 43,605. It is the capital of Uralsk province, which borders on the Caspian Sea, with an area of about 125,000 sq. miles.

Urania (ū-rā'ni-a), in Greek mythology, the muse of astronomy. She is generally represented holding in her left hand a celestial globe to which she points with a little staff.

Urania, antique statue in the Vatican.

Uranium (ū-ra'ni-um) a rare metal whose chemical symbol is U, atomic weight 240, specific gravity 18.4. The chief source of uranium is pitchblende. Metallic uranium is obtained in the form of a black powder, or sometimes aggregated in small plates, having a silvery luster and a certain degree of malleability. It forms several oxides, which are used in painting on porcelain, yielding a fine orange color in the enameling fire, and a black color in that in which the porcelain itself is baked. It is strongly radio-active, perhaps from containing radium, a constituent of pitchblende.

Uranus (ū'ra-nus), in Greek mythology, the son of Gæa, the earth, and by her the father of the Titans, Cyclopes, etc. He hated his children, and confined them in Tartarus, but on the instigation of Gæa, Kronos, the youngest of the Titans, overthrew and dethroned him.

U'ranus, in astronomy, one of the primary planets, and the seventh from the sun, discovered by Sir William Herschel in 1781. It was first called *Georgium Sidus* in honor of George III, and afterwards *Herschel*, in honor of the discoverer, finally receiving its present name in accordance with the practices of naming the planets after the deities of mythology. To the naked eye it appears like a star of the sixth magnitude. Its mean distance from the sun is about 1754 millions of miles, and the length of the year 30,686.82 days, or about 84 of our years. Its mean diameter is estimated at about 33,000 miles. Its volume exceeds the earth's about 74 times, but as its mean density is only 0.17 (the earth's being 1) its mass is only about 12½ times more. The length of its day is supposed to be between 9 and 10 hours. It is now generally admitted that this planet has four satellites, which differ from the other planets, primary and secondary (with the exception of Neptune's satellite), in the direction of their motion, this being from east to west, and they move in planes nearly perpendicular to the ecliptic.

U'rari. See *Curari*.

Ura Tyube (ö'ra työ'be), a town of Russian Turkestan, in the district of Sir Darya, with walls and a citadel. Pop. 22,088.

Urban (ur'ban), the name of eight popes, of whom the most notable were: URBAN II (Othon de Lagny), 1088-99, was elected by one party in the church, and in a council held at Rome he excommunicated his rival Clement III and his supporter, the Emperor Henry IV. By his decision and energy he extended the power of the popedom, and it was at his instigation that the first crusade was undertaken, and Jerusalem captured.— URBAN VI (Bartolommeo Prignani), 1378-89. so exasperated the cardinals by his reforming zeal that they caused a schism in the church by electing Clement VII. The two popes excommunicated each other until Urban died, under circumstances which suggested poisoning.—

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URBAN VIII (Maffeo Barberini), 1623-44, was more of a temporal prince than a cleric, extending the power of the church by raising armies, building fortresses, and entering into an alliance with France against the powers of Austria and Germany. He condemned Galileo and Jansen.

Urbana, a city, county seat of Champaign Co., Ohio, 47 miles W. by N. of Columbus. Here is Urbana University (Swedenborgian), organized in 1851. It has manufactures of strawboard, wool, brooms, paper and automatic telephones, etc. Pop. 7739.

Urbana (ur-ban'a), a city, county seat of Champaign Co., Illinois, 31 miles W. of Danville. It is the seat of the University of Illinois, a flourishing institution with over 5000 students, of the Illinois Laboratory of Natural History, and of a Government Experiment Station. It has railroad repair shops and other industries. Pop. 8500.

Urbino (ör-bē'nō), a town of North Italy, province of Pesaro e Urbino, 21 miles west by south of Pesaro. It is the see of an archbishop, the seat of a university; the chief buildings being the ducal palace and the cathedral. It was the birthplace of Raphael, whose house is still shown. Pop. 18,244.

Urchin, SEA. See *Echinus.*

Urdu. See *Hindustani.*

Ure (ūr), ANDREW, chemist, born at Glasgow in 1778; died in 1857. He was educated at Glasgow and Edinburgh universities, where he was graduated in medicine; became professor of chemistry at the Andersonian Institution (1804), director of the Observatory, Glasgow (1809), and was appointed analytical chemist to the Board of Customs (1834) in London. His chief works are: *A Dictionary of Chemistry* (two vols., 1821), *The Cotton Manufactures and Mines* (two vols., 1837) and a *Dictionary of Arts, Manufactures and Mines* (two vols., 1837-39), enlarged by Dr. Robert Hunt (4 vols., 1875-78).

Uredo (ū-rē'dō), a genus of minute parasitic fungi, the species of which are parasitic on plants. The diseases called smut, brand, burnt ear, rust, etc., are caused by their ravages.

Ureter (ū-rē'ter), the excretory duct or tube which conveys the urine from each kidney to the bladder. In man it is about the size of a goose-quill; and its length is from 16 to 18 inches.

Urethra (ū-rē'thra), in anatomy, the canal leading from the bladder to the external urinary opening, and serving for the excretion of the urine. In the male it is a complicated structure varying in length from 8 to 9 inches, and in the female it is a narrow membranous canal about 1½ inches in length.

Urfa (ur-fä'), a town of Turkey in Asia, in Upper Mesopotamia, a seat of an Armenian bishop, and of a French and an American mission. Pop. about 60,000.

Urga (ör'gȧ), a Chinese town in Northern Mongolia, on the river Tola, on the trade route between Peking and Kiachta. Pop. 30,000.

Uri (ö'ri), a canton in Switzerland, bounded by Schwyz, Unterwalden, Valais, Tessin, Grisons and Glarus; area, 415 square miles. It is one of the most mountainous of the Swiss cantons, presenting a complete chaos of mountain masses, the most famous of which is the St. Gothard. An interesting mass is the Urirothstock, 9620 feet high. The most important portion of the canton is the valley of the Reuss, which enters the Lake of Uri, an arm of the Lake of Lucerne. The chief industry is cattle-rearing; sheep and goats are also numerous; and timber is exported. The inhabitants are mostly Roman Catholics, and speak German. Uri was one of the three original Swiss cantons. It is visited by many tourists. The capital is Altorf. Pop. 19,700.

Uric Acid (ū'rik), an acid which occurs in small quantity in the healthy urine of man and quadrupeds, and in much larger quantity in the urine of birds. Uric acid constitutes the principal proportion of the urinary calculi and the concretions causing the complaint known as the gravel.

Urim (ū'rim), a kind of ornament or appendage belonging to the costume of the Jewish high-priest in ancient times, along with the *thummin*, in virtue of which he gave oracular answers to the people, but what the urim and thummin really were has not been satisfactorily ascertained.

Urinary Calculi. See *Calculus.*

Urine (ū'rin), an animal fluid or liquor secreted by the kidneys, whence it is conveyed into the bladder by the ureters, and through the urethra discharged. In its natural state it is acid, transparent, of a pale amber or straw color, a brackish taste, a peculiar odor, and of a specific gravity varying from 1.012 to 1.030. The character of the urine, however, is apt to be altered

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by the state of health, the season of the year, age, food, and a variety of other causes. A knowledge of the urine in health, and of the variations to which it is subject in disease, is of the utmost importance to the medical practitioner. One of its morbid constituents is diabetic sugar. See *Diabetes.*

Urmiyah. See *Urumiyah.*

Urn, a kind of vase, often one for holding the ashes of the dead. See *Cinerary Urn, Vase.*

Urodela (ū-ro-dē'la), an order of amphibian vertebrates in which the larval tail is always retained in the adult, the body being elongated posteriorly into the tail. There are two sections, the *Perennibranchiate Urodela,* in which the gills are retained through life, as in proteus, siren, etc.; and the *Caducibranchiate,* in which the gills disappear at maturity, as in newts and salamanders.

Ursa Major, Ursa Minor. See *Bear, Great* and *Little.*

Ursine Seal (ur'sīn; *Otaria ursina* or *Arctocephalus ursinus*), one of the otaries or eared seals, a native of the North Pacific, about 8 feet long. Called also *sea-bear.*

Ursinus College, a non-sectarian collegiate institution, established in 1869 at Collegeville, Pa. It has about 300 students.

Urson (ur'sun), a name given to the *Erethizon dorsātum,* or Canadian porcupine, which is 18 inches in length, and the quills of which are smaller than in the common porcupine.

Ursula (ur'sū-la), St., a virgin martyr, according to the legend a daughter of a prince in Britain put to death at Cologne by a horde of Huns, some say in 384, others in 453, together with 11,000, or more probably 11, virgins who accompanied her.

Ursulines (-linz), or Nuns of St. Ursula, a sisterhood founded by St. Angela Merici at Brescia, in 1537. They devote themselves to the succor of poverty and sickness and the education of female children. They had many houses in France during the seventeenth century. The Canadian Ursulines date from 1639.

Ursus. See *Bear.*

Urticaceæ (ur-ti-kā'se-ē), a nat. order of exogenous trees, herbs and shrubs. In an extended sense the order includes the Ulmeæ, or elm family; the Artocarpeæ, or breadfruit family; and the Cannabineæ, or hemp family. But the order is more frequently confined to the Urticeæ, or nettle family, typical genus, *Urtica.* (See *Nettle.*) The juice of the restricted order is watery, not milky; the wool in the arboreous or shrubbery species, which are all tropical, is soft and light. The fiber of the bark of some is valuable. It is in the restricted Urticaceæ that species covered with stinging hairs are found.

Urubamba (ur-ū'bam-ba), one of the head streams of the Amazon (which see).

Urubu (ū-rū'bū), the native name of an American vulture, the *Catharista Iota* (black vulture or zopilote), very nearly allied to the turkey-buzzard, which it closely resembles. This voracious bird is common in the villages and towns of the southern portion of the United States, acting as a scavenger.

Uruguay (ö-ru-gwī', or ū-rų-gwa'), a river of South America, which rises in Brazil, in the province of Santa Catharina, flows first westwards, then gradually turns south, and finally enters the estuary of La Plata opposite Buenos Ayres; length, about 800 miles.

Uruguay, or Banda Oriental del Uruguay, a republic of South America, bounded on the north and northeast by Brazil, on the east by the Atlantic, on the south by the Rio de la Plata, and on the west by the Uruguay, separating it from the Argentine Republic; area estimated at 72,150 square miles. The surface forms a vast undulating plain, generally flat, but broken in the interior by several ridges of moderate elevation. Gold is mined to some extent, and silver, copper and lead exist. The principal river is the Negro, which divides the state into two nearly equal portions, and on the southeast frontier is the large lake of Merim. The climate is mild and healthy, the general range of the thermometer being from 32° to 90° F. The extensive plains seem admirably adapted for agriculture, but they are occupied by large herds of horses, sheep and cattle, the rearing of these being the principal industry. The principal agricultural products are wheat, maize, oats, rye, millet and flaxseed. The chief exports are hides, tallow, preserved meat, sheepskins, bones, wool and horse hair, while the chief imports are cotton goods, woolens, coal and iron. Primary education is compulsory; there are normal, secondary and higher institutions, and a university at Montevideo. The Roman Catholic is the state religion, but all faiths are tolerated. The country is divided into nineteen provinces, and

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by the constitution of 1830 it is governed by a president, a senate and a house of representatives. Uruguay at one time formed part of the Spanish viceroyalty of Buenos Ayres, and the language of the country is Spanish. Capital and chief port, Montevideo. Pop. (1908) 1,042,668.

Urumiyah (ö-rụ-mē'a), or UR'MIYAH, a town of Persia, said to be the birthplace of Zoroaster, in the west of the province of Azerbijan, situated near a lake of the same name, 65 miles southwest of Tabreez. The surrounding district is of surpassing fertility. Pop. about 30,000.—The lake, situated 4300 feet above sea-level, is about 80 miles long from north to south, by 20 miles broad. It is extremely shallow throughout.

Urumtsi (u-röm'tsē), a city of Central Asia, in the Chinese province of Dzoungaria, on the northern side of the Thian-Shan Mountains. It was formerly of great commercial importance in the trade between Russia, Turkestan and India. Pop. estimated at 30,000.

Urus (ū'rus), a kind of large ox which ran wild in Gaul at the period of the Roman invasion, as described by Cæsar, perhaps the wild ox such as still exists in England, at Chillingham in Northumberland and Hamilton in Lanarkshire, or else the aurochs.

Usagara (ū-sa-ga'ra), part of the German possessions in East Africa, occupying an extensive area of country inland north of the river Rufiji. It has mountains of considerable height, and is generally fertile.

Usambara (ū-sam-ba'ra), a mountainous territory of German East Africa, situated about 50 miles N. W. of Zanzibar, extending inland from opposite the island of Pemba. The country grows rice, maize, india-rubber and tobacco.

Usbecks (ŏs'beks), or USBEKS, a Turkish tribe which at one time formed the ruling class throughout Western Turkestan, in Bokhara, Khokand, Khiva and Balkh, and partly also in Eastern Turkestan. In Western Turkestan they are now completely under the control of Russia, but in the districts mentioned they still form the nobility and landowners.

Usedom (ŏ'ze-dom), a Prussian island in the Baltic, on the coast of Pomerania; area, 150 square miles. The inhabitants are employed in agriculture and fishing; chief towns, Swinemünde and Usedom. Pop. about 33,000.

Ushant (ush'ant; French, *Ouessant*), an island of France, 15 miles off the west coast of the department of Finistère, to which it belongs; area, 6 square miles. It presents a very bold and rocky coast; fishing and the rearing of sheep are the principal occupations. Pop. 2761.

Ushas (ū'shas), in Hindu mythology, one of the ancient elemental divinities, the goddess of the dawn. In the Vedic hymns she is represented as a young wife awakening her children and giving them new strength for the toils of the coming day.

Usher (ush'er), an officer who has the care of the door of a court, hall, chamber, or the like. In the royal household of Britain there are four gentlemen ushers of the privy chamber. The *Gentleman usher of the black rod* is an officer of the order of the Garter (see *Black-rod*); the *Usher of the green rod*, an officer of the order of the Thistle. The service of ushers is customary in American churches, at weddings, and in places of amusement.

Usher, or USSHER, JAMES, Archbishop of Armagh, born at Dublin in 1580; died in 1656. He took orders in 1601; in 1607 received the professorship of divinity at Trinity College, Dublin, and the office of chancellor of St. Patrick's; in 1620 the bishopric of Meath; in 1623 a place in the Irish privy-council; and in 1624 the primacy of Ireland. He was a man of great erudition, his chief works being the *Annales Veteris et Novi Testamenti*, which forms the basis of the received biblical chronology; and *Britannicarum Ecclesiarum Antiquitates.*

Ushkup, or USKUB (us'kup), a town of Northwestern Turkey, on the river Vardar, seat of a Greek archbishop, with manufactures of leather, etc. Pop. 20,000.

Ussuri (ö-sö'ri), a river of Eastern Asia, a tributary of the Amoor, forming for a long distance the boundary between Russia and Chinese territories; length, 300 miles.

Usufruct (ū'zū-frukt), in law, the temporary use and enjoyment of lands or tenements, or the right of receiving the fruits and profits of lands or other things without having the right to alienate or change the property.

Usury (ū'zhū-ri). See *Interest.*

Utah (ū'tâ), a Western State of the American Union, bounded N. by Idaho, N. E. by Wyoming, E. by Colorado, S. by Arizona, and W. by Nevada; area, 84,990 sq. miles. The northeastern part

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of the State consists of the high ranges of the Uinta and Wasatch Mountains. Practically all of eastern and southeastern Utah consists of a series of broad elevated plateaus, deeply cut by canyons and narrow stream valleys. The western portion of the State lies entirely within the Great Basin region and is separated from the more eastern portion by the steep escarpment of the plateau. Within the Great Basin region broad, nearly level desert areas are interrupted by steep and rugged mountain chains running north and south. Within the plateau portion, there are numerous small valleys which are irrigated for intensive agriculture, but upon the plateau itself grazing is the principal industry. The greater portion of the agricultural land of the State lies along the western border of the mountain and plateau district where the water from higher levels is brought down and applied to the sandy and gravelly loams around the margin of the Great Basin region, and to the finer grained sediments of the stream valleys and of the level floors of recent lake basins. The possible dry farm area of Utah is practically all of that which is not covered by mountains or under irrigation canals, with the exception of some of the more desert districts where the rainfall is less than ten inches. The irrigating ditches of the State are over 5,887 miles in length, of an estimated cost of $17,840,775.00, and the reservoirs are extensive. The agricultural products include wheat, oats, barley, corn, potatoes, onions, cabbage, peas, tomatoes, sugar beets and fruits. Over 37,000 acres are devoted to the sugar beet and 46,000 acres to fruit and nursery interests. The chief wealth of the State is in its agricultural and mineral resources. Its minerals embrace gold, silver, copper, lead, iron, coal, salt, etc. In silver yield, Utah stands next to Montana. Manufactures are mainly confined to goods for inter-mountain consumption, though much beet sugar is made, and there are large smelting works. The capital is Salt Lake City; the next largest city is Ogden. Utah was settled in 1847 by Mormons; organized as a territory in 1850 and in 1896 admitted as a State. In 1882 Congress passed a stringent law against polygamy, and in 1890 the Mormon Church decreed its discontinuance. Pop. (1910) 373,351.

Utah Lake, a fresh-water lake in the State of Utah, 30 miles S. of Salt Lake City. It is 25 miles in length N. to S., with an extreme width of 13 miles. Its waters are drained into Great Salt Lake by means of the Jordan River. Several Mormon towns are on its eastern shores.

Utahs, or UTES, a tribe of American Indians of the Shoshone family, living on reservations in Utah and Colorado, having sold most of their lands to the United States government. Pop. about 2000.

U'takamand. See *Ootacamund.*

Uterus (ū'ter-us), or WOMB, an organ of females, situated between the bladder and rectum, in which the embryo is contained until it arrives at maturity, when it is finally born or expelled. In the virgin female it is somewhat pear-shaped, and measures about 3 inches long, 2 inches broad, 1 inch thick, and weighs about 1½ oz. It is divided into a *fundus* or base, a *body* and a *cervix* or neck. It opens into the vagina by a transverse aperture (*os uteri*), The organ is retained in its place by certain ligaments derived from the peritoneum. Its internal cavity is small, and at each superior angle at the fundus a *Fallopian* tube or oviduct enters. These tubes convey the ova or eggs from the *ovary* (which see) to the uterus. In structure the uterus is composed of an outer serous coat, a middle muscular coat, and an inner mucous lining. The arteries of the uterus are derived from the internal iliac and the aorta; the veins are large, and are called *sinuses* in the impregnated state. The nerves spring from the inferior hypogastric and spermatic plexuses, and from the third and fourth sacral nerves. The womb is liable to many diseases, of which the most frequent and important are inflammatory affections and tumors. It is also liable to become displaced in various ways from laxity of its ligaments and other causes (see *Prolapsus Uteri*).

Utica (ū'ti-kà), an ancient city of North Africa, on the river Bagrada, near its entrance into the Mediterranean, about 25 miles N. W. of Carthage. After the destruction of Carthage Utica became the capital of the Roman province. It was destroyed by the Arabs in the latter part of the seventh century.

U'tica, a city of New York, county seat of Oneida County, situated on the south bank of the Mohawk, 95 miles W. by N. of Albany. It has beautiful parks and charitable institutions, and is the site of a state hospital for the insane. Among its public buildings are the Federal Building, the County Building, City Hall, State Armory, Public Library. It has large and diversified manufacturing interests including twenty-two

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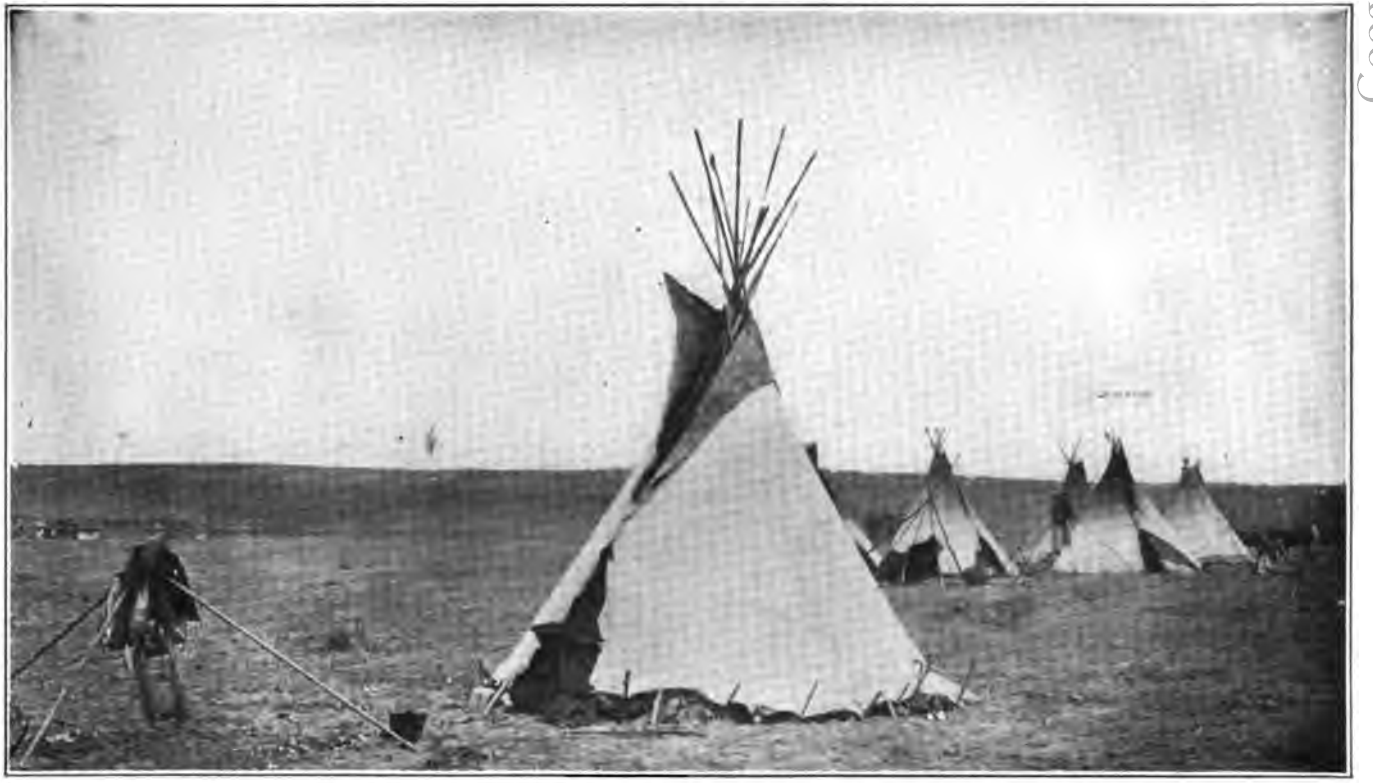

A UTE ENCAMPMENT

This photograph shows a typical encampment of one of the nomadic Indian tribes. The tepees or tents are made of skins, and may be quickly taken down, rolled into a bundle and packed upon the supporting sticks, which in moving are dragged by a pony.

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textile mills. It is also the center of a large dairy country and is a market for cheese. It is on the Erie Canal and the D. L. and W., the N. Y. C., the H. R., the N. Y. Ont. and W., and the W. Shore railroads. Pop. (1910) 74,419.

Utilitarianism (ū-til-i-tā'ri-an-izm), the general name given to those schools of morals which define virtue as consisting in utility. The name is more specially applied to the school founded by Jeremy Bentham, of which the most recent exponent is John Stuart Mill, but there are many other developments of the same principle both in ancient and modern schools of morals. See *Ethics*.

Utopia (ū-tō'pi-a), a name invented by Sir Thomas More, from the Greek *ou topos* (no place), and applied by him to an imaginary island, which he represents as discovered by a companion of Amerigo Vespucci. As described in his work called *Utopia*, written in Latin and published in 1516, the Utopians had attained great perfection in laws, politics, etc.

U'traquists. See *Calixtines*.

Utrecht (ö'trekht), an important town of Holland, capital of a province of the same name, 23 miles south-east of Amsterdam. It is pleasantly situated on the Old Rhine, is traversed by two canals crossed by numerous stone bridges, and is surrounded by strong forts. The town is well built, and has several squares, promenades, a government house, a Protestant cathedral (a fine Gothic building), mint, handsome town hall, palace of justice, etc. Educational establishments include a well-equipped university, a veterinary school, musical college, and schools for drawing and architecture. Utrecht is the central point of the Dutch railway system, and carries on an extensive trade in grain and cattle, and in the manufactures of the place, which include Utrecht velvet, carpets, floor-cloth, cottons, linens, chemicals, etc. Utrecht is the oldest town of Holland, and was called by the Romans *Trajectum ad Rhenum*, that is 'Ford of the Rhine,' later *Ultra-trajectum*. Pop. 121,317. The province of Utrecht has an area of 532 square miles, with a pop. (1905) of 276,543. It is generally flat, is well watered by the Rhine, Vecht, Amstel and other rivers, and is better suited for dairy farming and stock raising than for corn growing.

Utrecht, Peace of, a series of separate treaties agreed upon at Utrecht by the powers which had been engaged in the war of the Spanish Succession. On April 11, 1713, the States-general, Prussia, Portugal and Savoy, signed separate treaties with France. The emperor refused to accede to the peace, and his differences with France were subsequently adjusted by the treaties of Rastadt and Baden in 1714. By the treaty with England, France, among other things, recognized the Hanoverian succession, engaged never to unite the crowns of France and Spain, and ceded to Britain Nova Scotia, Newfoundland, St. Kitt's and Hudson Bay and Straits. Gibraltar and Minorca were also ceded on behalf of Spain. Holland retained the Spanish Netherlands until a barrier treaty was arranged with Austria. (See *Barrier Treaty*.) Louis XIV recognized the title of the King of Prussia, who received a part of Spanish Guelderland, and the sovereignty of Neufchâtel in Switzerland, while renouncing the principality of Orange. Savoy and Nice were restored to the Duke of Savoy, who was recognized as presumptive heir to the Spanish monarchy, and received the title of king. Philip V was not recognized till the conclusion of these treaties, but France treated for Spain, and formal treaties corresponding with those with France were afterwards signed with that power.

Utrera (ö-trā'rà), a town of Spain, province of Seville, 18 miles S. E. of the city of Seville. It has a fine Gothic church and a Moorish palace Pop. 15,138.

Utricularia (ū-trik-ū-lā'ri-a), the generic name of the *bladderworts* (which see).

U'vula. See *Palate*.

Uxbridge (uks'brij), a town of England, in Middlesex, on the Colne, 15 miles W. of London. It has an ancient church, an iron foundry, breweries, brick kilns, etc. There is a good trade in corn and flour. Pop. 10,374.

Uxmal (öz-mäl'), an ancient Indian town of Yucatan, Central America, about 35 miles S. W. of Merida. It is now an extensive group of ruins. Some of these are remarkable relics of a past state of Indian civilization. They comprise several large temple buildings of striking architecture and adornment.

Uz, in the Old Testament, a region probably lying to the east or south-east of Palestine, known as the scene of the story of Job.

Uzbegs. See *Usbecks*.

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V

V, the twenty-second letter of the English alphabet, a labial, formed by the junction of the upper teeth with the lower lip, and a gentle expiration. It resembles the letter *f*, but is *sonant* and not like it *surd* or *hard*.

Vaal River (väl), a river of South Africa, rises in the Quathlamba Mountains, and after a tortuous course of about 500 miles joins the Orange River (which see). It divides the Transvaal Colony from the Orange River Colony.

Vaccination (vak-si-nā'shun), inoculation with vaccine in order to procure immunity from smallpox, or with modified virus of any disease in order to produce it in a mild form and so prevent a serious attack. The practice of anti-smallpox vaccination was introduced by Jenner, and it soon came into common use instead of inoculation. (See *Jenner* and *Inoculation*.) The usual method in vaccination is to make a few scratches across one another, with a clean lancet point, upon the upper part of the arm. The matter from the cowpox, or from the vaccination pustule produced on another person, is then rubbed on the skin where the scratches have been made. If the vaccination proves successful a small inflamed pustule appears about the third day, and increases in size until the tenth day. On the eighth day the constitutional effects manifest themselves by slight pain in the part, headache, shivering, loss of appetite, etc. These subside spontaneously in one or two days. Afterwards the fluid in the pustule dries up, and a scab forms which disappears about the twentieth day, leaving a slight scar in the skin. Repeated vaccinations, with intervals of several years, have been recommended by medical authorities.

Anti-typhoid vaccination has recently found favor. It was introduced into the United States army and navy early in 1912. The following year not a single case of typhoid occurred, despite the frequent exposure to unsanitary conditions. Anti-typhoid vaccination has also been practiced with satisfactory results in British armies in various parts of the world, in the Japanese and the French army.

Vaccinium (vak-sin'i-um), the genus to which the whortleberry belongs.

Vacuum (vak'ū-um), empty space, or space devoid of all matter or body. Whether there is such a thing as an absolute vacuum in nature is a question which has been much controverted. The existence of a vacuum was maintained by the Pythagoreans, Epicureans, and Atomists; but it was denied by the Peripatetics, who asserted that 'nature abhors a vacuum.' The modern theory, which seems to be warranted by experience, is that an absolute vacuum cannot exist, the subtle medium known as ether being believed to be everywhere present. In a less strict sense a vacuum (more or less perfect) is said to be produced when air is more or less completely removed from an enclosed space, such as the receiver of an air-pump, a portion of a barometric tube, etc. In the receiver of the air-pump the vacuum can only be partial, as the exhaustion is limited by the remaining air not having sufficient elasticity to raise the valves. The Torricellian vacuum, that is, the space above the mercury in a carefully manipulated barometer tube, is more nearly perfect in this respect, but even this space is to some extent filled with the vapor of mercury.

Vacuum-brake. See *Brake*.

Vacuum Cleaner, a system of house cleaning by aid of machines creating a partial vacuum and by this means extracting the dust from carpets, sofas, and furniture in general, through a tube with a special nozzle. These machines have come largely into use, worked by hand or power, on small or large scale. The same principle has been applied to other purposes, on the farm, or elsewhere, such as the moving of grain, etc., and promises to become somewhat wide in its applications.

Vacuum-tube. See *Geissler's Tubes*.

Vade Mecum (vā'de mē'kum; Lat. *Vado*, 'I go'; *mecum*, me; *i. e.*, with me). A portable object

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for frequent or occasional use; a pocket companion; a book or manual for carrying about on the person. It is popularly given to any readily available work of reference, or a key to any science or profession, as *The Electrician's Vade Mecum*, *The Lawyer's Vade Mecum*, etc.

Vail (vāl), ALFRED, inventor, born at Morristown, New Jersey, in 1807; in 1837 became associated with S. F. B. Morse in his electric telegraphy experiments. He made several important inventions in this connection and is credited with that of the alphabet of dots, spaces and dashes which is the distinguishing feature of the Morse system. He was assistant superintendent of the first telegraph line in this country, invented the finger key, and received the first message from Washington. He died Jan. 18, 1859.

Vail, THEODORE NEWTON, electrician, was born in Carroll Co., Ohio, in 1845; a cousin of the preceding, and nephew of Stephen Vail, who built the engines for the *Savannah*, the first steamship to cross the Atlantic. He studied medicine, but was soon engaged in the railroad mail service and in 1878 entered the telephone business, organizing the first Bell Telephone Co. After 1896 he was engaged in introducing street railways and telephones in Argentina. He built up the national telephone organization, and has secured control of the Western Union Telegraph Co., and since 1907 has been president of the American Telegraph and Telephone Co., and the New York Telephone Co.

Valais (vȧ-lā; German, *Wallis*), a southern canton of Switzerland, abutting on France and Italy; area, 2026 square miles. It is surrounded on all sides by sections of the Alps, with ridges 13,000 to 15,000 feet high, and magnificent glaciers. The Rhone traverses the whole length of the canton, forming the largest valley in Switzerland. The mountain slopes are covered with forests of pine and hardwood trees, succeeded by productive orchards. Rich pastures support numerous cattle, the chief source of subsistence of the inhabitants; and in the lower valley of the Rhone there is much arable land, the finer fruits are grown, and silk-worms reared. The canton produces a good deal of wine. In the Upper Valais German, in the Lower French is spoken. The canton was admitted into the Confederation in 1553. Sion is the capital. Pop. 114,438.

Valdai Hills (vȧl'dī), a range of hills in Western Russia, averaging about 300 feet in height, but rising in Mount Popovagora to 1080 feet. They are well wooded, and contain the sources of the Volga, Dnieper, and Düna.

Valdepeñas (vȧl-dā-pān'yȧs), a town in Spain, New Castile, province of Ciudad Real, 110 miles south of Madrid. It is celebrated for a red wine. Pop. 21,015.

Val de Travers (vȧl dē trȧ-vār), a valley in the Swiss Jura, canton of Neufchâtel, drained by the Reuse flowing into the lake of Neufchâtel. It is cultivated in parts, and contains a deposit of asphalt, yielding annually upwards of 2000 tons. See *Asphalt*.

Valdivia (val-dē've-ä), a seaport of Southern Chile, on the navigable Calle-Calle. Pop. 9704.— Its port is Valdivia Port, or Corral, one of the best harbors on the Pacific coast of South America.

Valdosta (val-dos'ta), a city, capital of Lowndes Co., Georgia, 157 miles S.W. of Savannah. It is in a cotton-growing region, and has manufactories of yarn, oil, turpentine, lumber, and fertilizers. Pop. 7656.

Valence (vȧ-lȧns), chief town of the department of Drôme, France, on the left bank of the Rhone, 66 miles south of Lyons. It is a poorly-built town surrounded by old battlemented walls. It has a citadel, a small ancient cathedral, a public library, a court-house, and a theater. It is a bishop's see, and has manufactories of silk and cotton, and some trade in wine, liquors, spirits, silk, fruit, etc. Pop. 22,950.

Valencia (vȧ-len'shi-ȧ), a city of Spain, capital of the province of the same name, on the Guadalaviar, 2 miles from the Mediterranean and 190 miles E.S.E. of Madrid. It has much of the Moorish character, with mostly narrow winding streets, lined with good houses. It is an archbishop's see, and has a cathedral (dating from 1262 and greatly injured by modernization), a royal palace, an exchange, a general hospital, an academy of the fine arts, and other institutions. The university, founded in 1500, is one of the leading seats of learning in the kingdom. Outside the walls are the bull-ring, a botanic garden, and the Alameda, a delightful walk bordered with orange, pomegranate, and palm trees. The chief manufactures are silk, linen, hemp, glass, cigars, paper, and soap. Valencia was founded by Junius Brutus, 140 B.C. Pop. 233,348. The old province of Valencia is now broken up into the three

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provinces of Valencia, Alicante, and Castellon de la Plana. It is one of the most fertile and pleasant regions of Spain.

Valencia, a town of Venezuela, about 30 miles south of the Caribbean Sea, connected by railway with Puerto Cabello. It has a number of notable buildings, and an active commerce in coffee, sugar, rum, cattle, hides, etc. Pop. 38,654.

Valenciennes (vȧ-lȧn-syen), a fortified town of France, in the department of Nord, on the Scheldt, 30 miles S.E. of Lille. It is a somewhat gloomy town with narrow streets, but the houses are in general well built. There is a handsome cathedral of the thirteenth century and a notable town-hall of the seventeenth century. It has important manufactures of lace, fine linen, hosiery, beet-sugar, soap, etc. Pop. (1906) 25,977.

Valens (vā'lenz), FLAVIUS, a Roman emperor of the East, born in Pannonia in 328, and declared emperor of the East by his brother Valentinian I, who had already been elected emperor. The chief event of his reign was the war with the Goths under Athanaric, which lasted during the whole of Valens' reign. The Goths were several times defeated, and sued for peace, which was granted them (370). In 377 the Goths, driven southwards by the Huns, asked and received permission to settle on Roman territory. Irritated by the treatment they received at the hands of the imperial officials they soon took up arms, and in 378 defeated Valens and destroyed the greater part of his army. Valens was never seen or heard of afterwards.

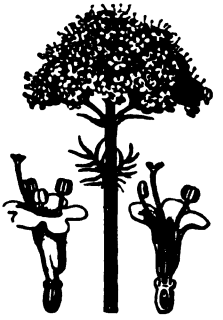
Valentia, or VALENCIA (vȧ-len'shi-ȧ), a small fertile island off the southwest coast of Ireland, belonging to County Kerry, about 5 miles long by 2 miles broad. It has slate and flag quarries and productive fisheries. The British Atlantic telegraph cables to Newfoundland start from Valentia, and there is a lighthouse.

Valentine, ST. (val'en-tīn), a saint of the Roman calendar, said to have been martyred in 306 A.D. The custom of choosing valentines on his day (Feb. 14) has been accidentally associated with his name. On the eve of St. Valentine's day young people of both sexes used to meet, and each of them drew one by lot from a number of names of the opposite sex, which were put into a common receptacle. Each gentleman thus got a lady for his valentine, and became the valentine of a lady. The gentlemen remained bound to the service of their valentines for a year. A similar custom prevailed in the Roman Lupercalia, to which the modern custom has, with probability, been traced. The day is now celebrated by sending anonymously through the post sentimental or ludicrous missives specially prepared for the purpose. But this practice is also on the decline.

Valentinians (val-en-tin'i-anz), a sect of Gnostics (which see).

Valenza (vȧ-lent'sȧ), a town of Northern Italy, province of Alessandria, pleasantly situated on the right bank of the Po. It has a cathedral of the sixteenth century. Pop. 7115.

Valerian (va-lē'ri-an; *Valerĭāna officinālis*), a plant of the order Valerianaceæ, native of Europe, which grows abundantly by the sides of rivers, and in ditches and moist woods. The root has a very strong odor, which is dependent on a volatile oil. It is used in medicine, in the form of infusion, decoction, or tincture, as a nervous stimulant and antispasmodic. Cats and rats are very fond of valerian. *Valeriana rubra*, or red valerian, is cultivated in gardens, as well as many other species, on account of its elegant flowers. *V. sylvatica*, wild valerian, is found in swamps from Vermont to Michigan; *V. pauciflora* in Ohio, Virginia and Tennessee; *V. ciliata* in low grounds in Canada, Wisconsin and Ohio. The true valerian of the shops is a product of *V. officinālis*.



Valerian (*Valerĭāna officinālis*).

Valerianus (va-le-ri-ā'nus), PUBLIUS LICINIUS, a Roman emperor from 253 to 260. He was taken prisoner by the Persians in 260, and his after fate is unknown.

Valerius Flaccus (va-lē'ri-us flak'-us), CAIUS, a Roman epic poet who flourished in the reign of Vespasian, about 70-80 A.D. He was author of the *Argonautica*, a poem which extended to eight books, but was left unfinished.

Valetta (vȧ-let'tȧ), a strongly fortified seaport, capital of Malta, on the N. E. coast of the island, situated

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on an elevated neck of land, with a large and commodious harbor on each side. The town has wide streets paved with lava, spacious squares, and fine quays, lined with elegant buildings. From the inequality of the site the communication between the different streets is maintained by flights of steps. The cathedral, built in 1580, contains the tombs of the knights of Malta or of St. John (see *John, Knights of St.*), and in a chapel are the keys of Jerusalem, Acre, and Rhodes. Other notable buildings are the governor's residence, formerly the palace of the grand-masters; the library, museum, university, and the military hospital. The dockyard is capable of admitting the largest men-of-war. Some shipbuilding and various other industries are carried on, and the trade includes grain, wine, fruits, cotton, and other manufactures, coals, etc. The mail steamers for Alexandria, Constantinople, etc., call here, and it is the chief station of the British fleet in the Mediterranean. Pop. 61,268. See *Malta*.

Valhalla (val-hal'a), in Northern mythology, the palace of immortality, inhabited by the souls of heroes slain in battle, who here spent much of their time in drinking and feasting. The name is applied figuratively to any edifice which is the final resting-place of many of the heroes or great men of a nation, and specifically to an edifice built by Ludwig I of Bavaria, a few miles from Ratisbon. See *Walhalla*.

Valkyrias (val-kir'i-as), VALKYRS, in Northern mythology, the 'choosers of the slain,' or fatal sisters of Odin, represented as awful and beautiful maidens, who, mounted on swift horses and holding drawn swords in their hands, presided over the field of battle, selecting those destined to death and conducting them to Valhalla, where they ministered at their feasts, serving them with mead and ale in skulls.

Valladolid (vâl-yâ-*do*-lid'), a city of Spain, capital of the province of the same name, 98 miles northwest of Madrid. It has a cathedral, many churches and suppressed convents, three hospitals, and a university. The church of Santa Maria la Antigua dates back to 1088. Columbus died in this city and Cervantes dwelt here 1603–06. It was formerly the capital of Castile. The manufactures consist of silks, cotton and woolen goods, hats, jewelry, paper, etc. Pop. 68,789. — The province has an area of 3042 square miles, and a population of 278,561. It is well watered by the Douro and its tributaries, and is very fertile.

Valladolid, a city of Mexico, same as Morelia (which see).

Vallandigham (va-lan'de-gam), CLEMENT L., politician, born at New Lisbon, Ohio, in 1820. He was a member of Congress 1858–63, supported the Southern Confederacy in the House of Representatives, and made such violent harangues in favor of the insurgents that he was arrested in May, 1863, on a charge of uttering disloyal sentiments. He was tried by court-martial and sentenced to confinement until the end of the war, this being commuted to banishment to the Confederate lines. Not being warmly received there, he went to Canada. In the same year the Democrats of Ohio denounced his banishment and nominated him for governor, but he was beaten by the largest majority ever given in that state. He died in 1871.

Vallejo (val-ā'hō or vâl-yā'hō), a city and seaport of California, capital of Solano Co., on an arm of San Pablo Bay, 23 miles N. E. of San Francisco, in a fruitful farming region. It has a spacious harbor, flour-mills, shipyards, iron-foundries and machine-shops. Large quantities of grain are shipped. There is a United States navy yard on Mare Island, near this place. Pop. 11,340.

Valleyfield, a town of Quebec province, Canada, on Beauharnois Canal, 6 miles S. E. of Cotean Landing. Has cotton, flour and other industries. Pop. 9447.

Valley Forge, a village in Chester Co., Pennsylvania, on the Schuylkill River, and 24 miles W. N. W. of Philadelphia. It is celebrated as the place where Washington with about 11,000 troops went into winter quarters in December, 1777. It was here also that Baron Steuben became inspector-general of the army, and the treaty of alliance with France was announced, May 6, 1778. During the winter the American army suffered very greatly from cold and hunger, and about half of the men were rendered unfit for active duty. The state has converted the locality into a public park, as a historic landmark, and a monument has been erected by the Daughters of the Revolution to the memory of the soldiers who died in camp during that winter of suffering.

Vallisneria (val-is-nē'ri-a), a genus of aquatic plants, of the nat. order Hydrocharidaceæ. They grow at the bottom of the water, and the male and female flowers are separate. When the time of fecundation arrives the male flowers become detached, and

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float on the water; the female flowers develop long spiral peduncles, by means of which they reach the surface, where they are fertilized by the male flowers. *V. spirālis* grows in still waters in Italy, and in the Rhone; it is commonly grown in aquariums.

Vallombrosa (vä-lom-brō'sä), formerly an abbey in a wooded valley of the Apennines, belonging to the diocese of Fiesole, in the Florentine territory, where Giovanni Gualberto founded a house for monks in 1038, subject to the rule of St. Benedict. The building (dating from 1637) now accommodates an institute of forestry.

Valmy (val-mē), a village of France, department Marne, celebrated for the affair known as 'the cannonade of Valmy,' where the French republican troops under Kellermann defeated the Prussians in 1792.

Valois (vål-wä), House of, a dynasty which ruled France from 1328 to 1589. In 1285 Philip III gave the county of Valois (now in the departments Oise and Aisne) to his younger son, Charles, and upon the extinction of the Capet dynasty, in 1328, the eldest son of this Charles of Valois ascended the French throne as Philip VI, and founded the Valois dynasty, which was followed by the house of Bourbon. See *France* (*History*).

Valparaiso (vål-pä-rī'sō), the principal port of Chile, capital of the province of Valparaiso, situated on a large bay of the Pacific, 90 miles W. N. W. of Santiago. The bay is open to the north, but well sheltered from winds in other directions, and is capable of accommodating a very large number of vessels. The custom-house is the only public building worthy of note. Valparaiso is the great commercial emporium of Chile, and is in railway communication with Santiago, the capital. The chief imports into Valparaiso are manufactured goods, sugar, wine, tobacco, and cigars. The exports consist mainly of wheat, barley, wool, etc., and of mining produce. The imports of Valparaiso constitute nearly the whole of the imports of Chile, while the exports form a large portion of the total exports. Pop. 180,600.—On August 16, 1906, the city was destroyed by an earthquake, but has been rebuilt.

Valparaiso, a city, capital of Porter Co., Indiana, 44 miles S. E. of Chicago. It contains several educational institutions and has manufactures of school specialties, mica, paints, and varnishes. Pop. 6987.

Valpy (val'pi), Richard, an English scholar, born in 1754. He was graduated at Pembroke College, Oxford, in 1776. He entered the church, and for several years held a living at Bury St. Edmunds. From 1781 to 1830 he was head-master of Reading Grammar School, and compiled a Latin and a Greek grammar and several classical textbooks, which enjoyed a wide reputation. He died in 1836.

Valve (valv), a kind of movable lid or cover adapted to the orifice of some tube or passage, and so formed as to open communication in one direction and to close it in the other, used to regulate the admission or escape of a fluid, such as water, gas, or steam. Some valves are self-acting, that is, they are so contrived as to open in the required direction by the pressure of the fluid upon their surface, and immediately to shut and prevent the return of the fluid when the direction of its pressure changes. Others are actuated by independent external agency. Examples of the former kind are presented in the valves of pumps, and in the safety-valves of steam boilers, and of the latter in the slide-valves appended to the cylinder of a steam-engine for the purpose of regulating the admission and escape of the steam. The construction of valves admits of an almost endless variety of devices. See *Safety-valve*, *Pump*, etc.

Vambéry (vâm'bā-rē), Herman, a Hungarian traveler and scholar, born in 1832. He studied at Pressburg, Vienna, and Budapest, and then went to Constantinople, where he lived by teaching French. In 1858 he published a Turkish-German dictionary.

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In 1861–64, disguised as a dervish, he undertook an extensive journey of exploration through Persia into Turkestan, and visited Khiva, Bokhara, and Samarcand. In 1865 he became professor of Oriental languages at the University of Budapest, and he wrote many valuable linguistic works as well as works on his travels, including *Travels in Central Asia* (1865); *Wanderings and Adventures in Persia* (1867); *Sketches of Central Asia* (1868); *History of Bokhara* (1873); *Central Asia and Anglo-Russian Frontier* (1874); *Islam in the Nineteenth Century* (1875); *The Origin of the Magyars* (1882); *The Coming Struggle for India* (1885); *Story of Hungary* (1887); etc. The *Story of his Life and Adventures* appeared in 1888. He has also been a frequent contributor to periodical literature in England, Germany, and Hungary.

Vampire (vam'pīr), a superstition of Eastern origin existing among the Slavonic and other races on the Lower Danube. A vampire is a ghost still possessing a human body, which leaves the grave during the night and sucks the blood of living persons, particularly of the young and healthy. Dead wizards, heretics, and such like outcasts become vampires, as does also any one killed by a vampire. On the discovery of a vampire's grave the corpse must be disinterred, thrust through with a white-thorn stake, and burned.

Vampire-bat, a name for certain bats inhabiting South America. The name was given from the blood-sucking habits attributed to these bats, but how many of them really attack animals and suck blood from them is not quite clear. One species at least, known as the vampire-bat (*Vampÿrus spectrum*), of large size and having formidable teeth, seems to be conclusively acquitted of the charge, its regular food being fruits and insects. It has large leathery ears, an erect spear-like appendage on the tip of the nose, wings when extended measuring 28 inches. Several bats, however, have been proved to be blood-suckers, the best-known being *Desmödus rufus*, a species only about 4 inches long and 15 or 16 in expanse of wing. It has large prominent upper incisors of peculiar shape, and upper canines somewhat similar, and the stomach and intestines are evidently specially adapted for a diet of blood. This species of bat seems to be generally distributed throughout the warmer parts of South America from Chile to Guiana. The blood-sucking propensities of these bats are by no means so dangerous as formerly and popularly described; but there is little doubt that they do attack horses and cattle, and sometimes even man in his sleep.

Van (vän), chief town of a vilayet of the same name in Armenia, Asiatic Turkey. It is pleasantly situated near Lake Van, and is overlooked by an old citadel. Cotton cloth is manufactured and exported. Pop. about 30,000. — Lake Van is a salt-water lake, 5467 feet above sea-level; area, about 1600 square miles. It contains many islands, and has no visible outlet.

Vanadium (va-nā'di-um), a metal discovered in 1830, although what was at first considered the metal was really an oxide; chemical symbol V; atomic weight 51.2. Vanadium has a strong metallic luster, considerably resembling silver, but still more like molybdenum. When in mass it is not oxidized either by air or water, but the finely-powdered metal quickly takes up oxygen from the air.

Van Beneden (van ben-ē'den), Pierre Joseph, a Belgian naturalist, born at Mechlin in 1809; died in 1894. He became professor of geology at Ghent in 1835, and at Louvain in 1836, remaining there till his death. In 1843 he established the first laboratory and aquarium for the study of marine life, and he won a wide reputation by his study of parasites.

Vanbrugh (van-brö'), Sir John, an English architect and dramatist, born about 1666, and was educated partly in England and partly in France. He entered the army, became well known in London as a man of fashion, and then turned his attention to play-writing. His first play, *The Relapse*, was brought out at Drury Lane about 1697, and was followed by *The Provoked Wife*, and *Æsop*. The first two of these had all the wit and most of the freedom of treatment which characterized that period, but *Æsop* was moral and dull, and therefore unsuccessful. How he obtained his knowledge of architecture is not known, but at this time (1702) Vanbrugh designed Castle Howard, the seat of the Earl of Carlisle. Afterwards he entered with Congreve into a speculation to build a great theater at the west end of London, in which he was his own architect; but it did not prove a success. In 1706 he was commissioned by Queen Anne to present the garter to the Elector of Hanover, and the same year he was occupied with the erection of Blenheim Palace. This work got him into considerable pecuniary trouble, as parliament, which voted it,

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voted nothing for its payment. He built many other mansions for the nobility; in 1714 he was knighted by George I, in the following year appointed controller of the royal works, and in 1716 surveyor of Greenwich Hospital. He died March 26, 1726. Vanbrugh's plays are admirable in dramatic conception as well as in wit, and his architectural works received the approval of Sir Joshua Reynolds.

Van Buren (van bū'ren), **MARTIN**, eighth president of the United States, was born at Kinderhook, New York, Dec. 5, 1782. He early studied law, and in 1812 was elected to the state senate. He was attorney-general from 1815 to 1819, and in 1821 was elected United States senator. In 1828 he became governor of New York, and in the following year President Jackson appointed him secretary of state. In November, 1832, he was elected vice-president by the Democratic party in association with President Jackson, and in 1836 was elected president of the United States. The difficulties which his administration had to face were chiefly connected with the deposit of state funds in private banks, and his term of office was made notable by a business depression of great intensity. He was again nominated for President in the elections of 1840 and 1848, but was unsuccessful on both occasions. He wrote a treatise entitled *An Inquiry into the Origin and Course of Political Parties in the United States*. He died in July, 1862.

Vancouver (van-kō'ver), **GEORGE**, an English navigator, born about 1758; died in 1798. He entered the navy as midshipman in 1771; accompanied Captain Cook on his second and third voyages of exploration (1772-74 and 1776-79); was made first lieutenant in 1780; and served in the West Indies until 1789. In 1790 he was put in command of a small squadron sent to take over Nootka from the Spaniards, and was also charged to ascertain if there was a northwest passage. He sailed in the *Discovery* in 1791, spent some time at the Cape of Good Hope, and afterwards at Australia and New Zealand, the coasts of which he surveyed. He then went north and received formal surrender of Nootka, and spent the three summers of 1792-94 in surveying the coast as far north as Cook's Inlet. On his return voyage he visited the chief Spanish settlements on the west coast of South America, and reached England in 1795, where a narrative of his voyage was published in 1798.

Vancouver, a town and port of British Columbia, on the Strait of Georgia, and forming the western terminus of the Canadian Pacific Railway. Though established as late as 1885, it has had a rapid growth and developed a flourishing trade and numerous manufactures. Pop. (1914) 207,383.

Vancouver, a city, county seat of Clarke Co., Washington, on the Columbia River, 6 miles N. of Portland, Oregon; served by five railroads. the largest seagoing vessels reach the wharf, fruit, lumber, flour, walnuts, potatoes, prunes, and dairy products being the principal shipments. There are saw-mills, fruit-packing industries, etc., mining and manufactures. Pop. 12,000.

Vancouver Island, an island in the Pacific, off the west coast of British Columbia, of which province of Canada it forms part; length, from 250 to 300 miles; breadth, from 10 to 70 miles; area, about 12,000 square miles. It is generally mountainous, and heavily timbered. The climate is temperate, and the soil, in the south and east, fertile and favorable to agriculture and fruit growing. The interior is rocky, interspersed with small grass tracts suitable for pasturage, and with lakes and small streams. Coal is worked (at Nanaimo), and gold, copper and iron ore, and other minerals are found. Horses, cattle.

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sheep and pigs thrive well, and the seas and lakes abound with fish. Large quantities of salmon are exported, and there is an extensive trade in fur, the skins exported being chiefly those of the mink, marten, sable, fox, bear, beaver, otter, seal, and deer. There are numerous good harbors along the coasts, the chief of which is Esquimault (which see). As this island lies opposite the terminus of the Canadian Pacific Railway it has recently acquired great importance. The chief town of the island, and the capital of British Columbia, is Victoria, in the extreme southeast. Pop. of the island about 50,000.

Vandals (van'dals), a German nation or confederation, probably allied to the Goths, who occupied at an early period the country on the south of the Baltic, between the Oder and the Vistula. At a later period they appear to have descended into Silesia, and subsequently occupied Pannonia, Moravia, and Dacia. In 406, in conjunction with a German host, they ravaged Gaul, and thence found their way into Spain. After defeating an allied army of Goths and Romans, they seized Seville and Carthagena, and, led by Genseric, crossed to Africa. Here they vanquished the Roman governor (429), and founded a kingdom, which absorbed the greater part of the Roman possessions. Genseric immediately began to revive the maritime glories of Carthage, and extended his conquests to Sicily, Sardinia, and Corsica. He also invaded Italy and sacked Rome in 455. Genseric concluded a long reign in peace in 477. The kingdom of the Vandals was continued under his descendants — Hunneric, his son, who immediately succeeded him; Gundamund, 484; Thrasimund, 496; Hilderic, 523; Gelimer, 530. It was overthrown in 534 by Belisarius, the general of the eastern Emperor Justinian.

Vanderbilt (van'dêr-bilt), Cornelius, capitalist, born on Staten Island in 1794; died in 1877. A poor boy, he engaged in steamboat enterprises, which greatly expanded, and in later life in railroad management, and acquired great wealth. His son, William Henry (1821–85) added enormously to this wealth. The Vanderbilt University (Methodist Episcopal) at Nashville, Tennessee, was founded by Cornelius, who presented it with $1,000,000; to which William H. added $310,000.

Van Diemen's Land (van dê'men). See *Tasmania*.

Van Dyck (van-dik'), Sir Anthony, except perhaps Titian the greatest of all portrait-painters, was born at Antwerp on March 22, 1599, where his father was a merchant. He studied painting first under Van Balen, and then under Rubens, quitting the studio of the latter after a few years to proceed to Italy, where he spent about five years (1623–28) chiefly at Genoa, Venice, and Rome, and then returned to Antwerp. Having acquired a great reputation as a portrait painter he was invited to England by Charles I, who bestowed upon him the honor of knighthood, a considerable annuity, and a summer and winter residence. The painter

Sir Anthony Vandyck.

rewarded this generosity by unceasing diligence, and executed, besides a multitude of portraits, several mythological and historical paintings. He was fond of splendor, and lived in a very expensive style. Shortly after his marriage to Mary Ruthven, a granddaughter of the Earl of Gowrie, he died (December 9, 1641), and was buried in St. Paul's. Vandyck's great strength lay in portrait painting, and he excelled in the knowledge of *chiaroscuro*, but he sometimes amused himself with engraving and etching.

Van Dyke (van dik), Henry, author, was born at Germantown, Pennsylvania, in 1852. He was educated at Princeton and Berlin, became a pastor at Newport in 1878, at New York in 1882, preacher to Harvard University in 1890–92 and 1898–99, and lecturer at Yale in 1896. As an author he has been prolific, some of his works being *The Poetry of Tennyson* (1889), *The First Christmas Tree* (1897), *The Toiling of Felix and other Poems* (1900), *The Open Door* (1903), *The Spirit of Christmas* (1905), *Out of Doors in the Holy*

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Land (1908). In 1913 he was appointed ambassador to the Netherlands.

Vandyke Brown, a pigment obtained from a kind of peat or bog-earth, of a fine, deep, semitransparent brown color; so called from its being supposed to be the brown used by Vandyck in his pictures.

Vane (vān), SIR HENRY, an English statesman and writer, born in 1612, eldest son of Sir Henry Vane, secretary of state. He was educated at Westminster and Oxford, afterwards completing his education at Geneva, where he became a puritan and a republican. Returning to England, he found that his religious and political opinions exposed him to much ill-will and annoyance, and he consequently emigrated to New England, arriving at Boston in 1635. He was elected governor of Massachusetts in 1636. In 1637 he returned to England, after which he was knighted, entered parliament, and became treasurer of the navy. He took part in the impeachment of Strafford, and was a zealous supporter of parliament in the civil war and one of the leaders in the Long Parliament. He was also a supporter of the Solemn League and Covenant. He was averse to the execution of the king, and came into conflict with Cromwell in consequence of the forcible dissolution of the Long Parliament (1653). In 1656 he was imprisoned in Carisbrooke Castle for four months, by order of Cromwell, on account of a pamphlet he had written. On his release he continued to resolutely oppose the government of Cromwell and of his son Richard. In 1659 he was a member of the committee of safety and president of the Council of State. After the Restoration he was sent to the Tower (Feb., 1660), and subsequently moved from prison to prison. A rising of the Fifth Monarchy party (Jan., 1661) led to increased severity towards him, and he was tried for high treason before the Court of King's Bench, June 2, 1662, condemned, and beheaded on Tower Hill on June 14th. He wrote various theological works characterized by excessive mysticism, and his religious views gave rise to a small circle of disciples known as Vanists.

Vanella. See *Lapwing.*

Van Eyck. See *Eyck.*

Vanilla (va-nil'a), a flavoring agent used in confectionery, and in the preparation of liqueurs, procured from the fruit of *Vanilla aromatica* and *V. planifolia,* orchidaceous plants of tropical America, remarkable on account of their climbing habits, and now cultivated in various tropical countries, including Ceylon and India. It has a fragrant odor, and is also used in medicine as a stimulant and promoter of digestion.

Vanilla (*Vanilla aromatica.*)

Vannes (vân), a seaport of France, capital of the department of Morbihan, 64 miles N. W. of Nantes. It has ancient walls and gates. There is a cathedral, and a museum rich in Celtic antiquities. Pop. (1906) 16,728.

Van Rensselaer (ren'sel-ler), STEPHEN, statesman, was born in New York in 1764; died in 1839. He became known as 'the Patroon,' being a descendant of the older patroons, or great land holders. He was lieutenant-governor of the State for six years, and commanded the New York militia in 1812. He coöperated with Clinton in building the Erie Canal, and founded in 1824 Rensselaer Institute (now the Polytechnic School) at Troy; was distinguished for his zeal in the cause of science.

Van Wert, a city, capital of Van Wert Co., Ohio, 27 miles W. N. W. of Lima. It has railroad shops, lumber and flour mills, and oil-well supply works, etc. Pop. 7157.

Vapor (vā'pur), in physics, a term applied to designate the gaseous form which a solid or liquid substance assumes when heated. Vapor is, therefore, essentially a gas, and seeing that all known gases have now been proved to be liquefiable, no physical difference can be said really to exist between an ordinary gas, such as oxygen, and a vapor, such as steam. In common language, however, a difference is usually recognized; a *gas* is a substance which at ordinary temperatures and pressures exists in a state of vapor; while a *vapor* is produced by the application of heat to a substance which normally exists in a solid or liquid form. The difference has been otherwise explained to be one not so much of kind as of degree; steam in the boiler of a steam-engine being said

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to be in a state of vapor, while superheated steam is said to be a gas. Aqueous vapor formed on the surface of the land and water is always present in suspension in the atmosphere, and when it meets with a reduction of temperature it condenses into water in the form of rain or dew.

Var (vär), a department in the southeast of France, bordering upon the Mediterranean, and covered in the interior with ramifications of the Alps; area, 2349 square miles, of which only a small portion is arable. There are magnificent forests of pine and oak, and the vine, olive, mulberry and tobacco are extensively cultivated. Minerals include salt, lead, coal, marble, gypsum and building stone. The manufactures consist of woolens, perfume, liqueurs, olive-oil, soap, leather and silk. The coast is bold and deeply indented; and the fishing, both of tunny and anchovies, is actively carried on. The capital is Draguignan. Pop. 326,384.

Varangians (vā-ran'ji-anz), or VARAGIANS, the name applied to the Norse vikings, who, at the close of the ninth century, founded various principalities in Russia. Some of them afterwards entered the service of the Byzantine emperors, and became the imperial guards at Constantinople. Here they were recruited by Anglo-Saxons and Danes, who fled from England to escape the Norman yoke.

Varanidæ. See *Monitor.*

Varasdin (vâ-râs-dēn'), a town of Austria, capital of a county of the same name in Croatia. It has an old castle, several Roman Catholic churches, a high school, and manufactories of tobacco, liqueurs, vinegar, and silk wares. Pop. 12,930.

Variable Quantities, in mathematics, such quantities as are regarded as being subject to continual increase or diminution, in opposition to those which are *constant,* remaining always the same; or quantities which in the same equation admit of an infinite number of sets of values. Thus, the abscissas and ordinates of a curve are variable quantities, because they vary or change their magnitudes together, and in passing from one point to another their values increase or diminish according to the law of the curve. See *Calculus* (in mathematical sense).

Variable Stars, stars which undergo a periodical increase and diminution of their luster. This is supposed to be due to dark companions, which cut off part of their light at intervals by rotating around them.

Varicose Veins (var'i-kōs), veins in a diseased state, which became dilated and uneven, and form hard knotty swellings in the situation of their valves. The disease is a common affection of the lower limbs, where sometimes the varix bursts and hemorrhage takes place. It also occurs in the veins of the scrotum and lower rectum, producing in the latter case bleeding piles. Varicose veins are caused by local obstruction of the circulation of the blood, and are common in pregnancy, while stout people, and those who stand most of the day at work, are apt to suffer from them. The treatment consists in the application of proper bandages, and rest to the limb supported in an elevated position.

Variety (va-rī'e-ti), in scientific classifications, a subdivision of a species of animals or plants; an individual or group of individuals differing from the rest of the species to which it belongs in some accidental circumstances which are not essential to the species. Varieties are considered as less permanent than species, and those naturalists who look upon species as strictly distinct in their origin, consider varieties as modifications of them arising from particular causes, as climate, nourishment, cultivation, and the like. See *Species.*

Varna (vär'nâ), a fortified town of Bulgaria (of which it is the chief port), on the Black Sea. It has a good harbor, and a large trade with Constantinople in grain. It is the see of a Greek archbishop. A memorable battle between the Turks and Hungarians was fought here in 1444. It was taken by the Russians in 1828, but restored to Turkey a year later by the Peace of Adrianople. The Crimean expedition sailed from Varna in 1854. Pop. (1906) 37,155.

Varnhagen von Ense (fârn-hâ'gen fon en'se), KARL AUGUST, a German biographer, born at Düsseldorf in 1785; died at Berlin in 1858. He had a considerable military experience in his younger days, and was latterly engaged in the Prussian diplomatic service. Among his chief works are *Biographische Denkmale, Denkwürdigkeiten und Vermischte Schriften, Tagebücher,* and *Lives* of Von Seydlitz, Sophia Charlotte, Marshal Keith, etc.

Varnish (vär'nish), a solution of resinous matter, forming a

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clear, limpid fluid, capable of hardening without losing its transparency, and used by painters, gilders, cabinet makers, etc., for coating over the surface of their work, in order to give it a shining, transparent, and hard surface, capable of resisting in a greater or less degree the influences of air and moisture. The resinous substances most commonly employed for varnishes are mastic, sandarac, lac, copal, amber, and asphalt; and the solvents are fixed oil, volatile oil, and alcohol. Varnishes are colored with arnotto, gamboge, saffron, dragon's-blood, etc. Fixed-oil varnishes are the most durable, and are the best adapted for exposure to the weather. Volatile-oil varnishes consist of a solution of resin in oil of turpentine. They are chiefly used for paintings.

Varnish Tree, the name given to various trees which furnish a resinous juice used for varnishing or for lacquering. They are chiefly natives of the hotter parts of the Eastern Hemisphere.

Varro (var'ō), MARCUS TERENTIUS, one of the most learned men and prolific writers of ancient Rome, born B.C. 116, served in the army, and subsequently filled several public offices. Varro was the intimate friend of Cicero, and was proscribed by Antony, but he escaped and returned to Rome under Augustus, and died there in B.C. 27. Of his numerous writings, chiefly on language, history, and philosophy, only one has come down to us entire — a treatise upon agriculture (*De Re Rustica*). Fragments of a treatise on the Latin language (*De Lingua Latina*) are also extant.

Varuna (va'rō-na), in Hindu mythology, the god of water, the cause of rain, lord of rivers and the sea,

Varuna, the Indian God of Waters.

the Hindu Neptune or Poseidon indeed. His name corresponds with Greek Ouranos (Uranus), and meant originally the sky or heavens. He is represented as a white man, four-armed, riding on a sea animal.

Varus (vā'rus), PUBLIUS QUINTILIUS, a Roman general. In 7 B.C., having received from Augustus the command to introduce the Roman jurisdiction into the German territory conquered by Drusus, he was carrying out his mission when he was suddenly attacked by an immense host under Arminius, and his whole army destroyed. Varus put an end to his own life. See *Arminius*.

Vasa (vä'sä), GUSTAVUS. See *Gustavus I.*

Vasari (vä-sä'rē), GIORGIO, an Italian painter and architect, but most distinguished as the biographer of artists, was born at Arezzo, in Tuscany, in 1512, and studied under Luca Signorelli, Michael Angelo, and Andrea del Sarto. As an architect he showed great ability; as a painter he was less successful. His *Vite de' più eccellenti Pittori, Scultori ed Architetti* ('Lives of the Most Excellent Painters, Sculptors and Architects') is of great interest, but contains many errors. Vasari died in 1574.

Vasculares (vas-kū-lā'rēz), or VASCULAR PLANTS, a great division of plants, consisting of those in which vascular tissue appears, and including all phanerogamous plants, both exogenous and endogenous. See *Cellulares*.

Vascular Surgery, the surgery of the blood vessels, practically created by Alexis Carrel. Vascular surgery was only in its initial stage when Dr. Carrel began his investigations, so that an entire system had to be worked out. The first point was to show that the wall of a vessel could be sutured without giving rise to coagulation in the interior. This had already been done in the case of a puncture in the wall of a vein, but it was now demonstrated that an incision in the wall of an artery could be sutured while the continuity of the 'lumen' or point of opening was preserved. The methods which had proved successful in the surgery of other organs, however, were too gross for the surgery of the blood-vessels and only infinite care led to the desired results. It is now the standard treatment of an incised wound to suture the wound and not to tie the vessel in its continuity.

Vascular Tissue (vas'kū-lar), in plants, consists of elongated ducts or cells, which may have closed extremities, so that fluids pass from one cell to another through the partition walls, or these partitions may be partly obliterated, thus forming a continuous tube. See *Botany*.

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Vase (vāz, vâz), a name applied to certain vessels of an ornamental character. Vases were made in ancient times of all materials, but those which have come down to us in greatest numbers are the so-called Etruscan vases, made of terra cotta, and adorned with painted figures. (See *Etruscan Vases.*) Such vases have been found in most Greek cities as well as in Etruria, and all are really the productions of Greek art. The Greek vases of the oldest

Grecian Vases.

style mostly come from Corinth and the islands of Thera and Melos; and those of the late rich style have been almost exclusively discovered in Lower Italy (Apulia and Lucania), and were probably manufactured there, chiefly in the fourth and third centuries B.C. Vases were used for all purposes, but one peculiar and very common application of them was to adorn sepulchers. Chased metal vases were in use in ancient times both among the Greeks and

Chinese, Japanese, and Indian Vases.

Romans, and many of the more valuable and beautiful kinds of stone were also used for making vases. Murrine vases (which see) were highly esteemed at Rome. Another favorite kind of vases at Rome was that called cameo vases, made of two layers of glass, the outer of which was opaque, and was cut down so as to leave figures standing out upon the lower layer as a ground. The celebrated Portland vase is an example of this kind. At a later period glass vases surrounded with delicate filigree work were introduced. Italy, France, and Germany in the sixteenth and seventeenth centuries produced many vases which are the perfection of artistic form and execution, and since the fifteenth century many masterpieces of the glass art in the form of vases have issued from the Venetian manufactories. From India, China and Japan have also been obtained vases of varying materials, especially of porcelain, vying in elegance of form and beauty of ornamentation with those produced in Europe.

Vasectomy (vā-sec′tu-mi) is the operation of cutting out a small section of the *vas deferens* of the male. It is done in some penal institutions and homes for mental defectives to prevent procreation of similar public charges. It is legally enforced on these classes of persons in eight states. The result of the operation is to prevent propagation of unfit persons and improve the mental and physical condition of those operated upon. This operation has already been carried out for over six years in one of the States of the Union, which has the most intelligent criminal and charitable code, with actual results that far exceeded expectations. The effect upon the male criminal was to render him much more amenable to discipline, to improve his general nutrition and his mental balance, and to give him a sense of protection against himself and of a new grip upon his life problem. For instance, while the average rate of relapse and return of thousands of convicts sent out from this institution has been about 25 per cent., out of 106 men set at liberty on parole after being submitted to vasectomy, only 5 have relapsed and been brought back. It originated with Dr. H. C. Sharp, of Indianapolis, and is called the 'Indiana plan.' The *vas deferens* can at any time be reunited and thus restored to its pre-operation condition, with the function of procreation restored. The corresponding operation on the female is called *salpingotomy* (which see).

Vaseline (vas′e-lēn), a name given to a product obtained from petroleum after the lighter hydrocarbons are driven off, and composed of a mixture of paraffins. It is used as a base for ointments, pomades, cold-cream, etc., and for coating surgical instruments and steel surfaces generally to protect them from rust.

Vassal. See *Feudal System.*

Vassar College, a university at Poughkeepsie, New York, founded by Matthew Vassar in

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1861 for the higher education of women. It confers the degrees of B.A. and M.A., and the course of studies resembles those of other first-class colleges. Its annual class of students numbers over 1000 and it has endowed funds of nearly $1,400,000.

Vateria (va-tē'ri-a), a genus of plants, nat. order Dipterocarpaceæ. Two species, *V. indica* and *V. lanceæfolia*, belong to India, forming large trees, valuable both for their timber, and also for the products which they yield. *V. indica*, whose timber is much employed in shipbuilding, produces the resin called in India *copal* and in England *gum anime*. It also yields a fatty substance called *piney-tallow*.

Vathi, or VATHY. See *Ithaca*.

Vatican (vat'i-kan), the most extensive palace of modern Rome, the residence of the pope, built upon the Vatican Hill, from which it has received its name, on the opposite side of the river from the bulk of the city, immediately to the north of the cathedral of St. Peter's. It is a long rectangular edifice lying north and south, with an irregular cluster of buildings at either end. The present building was begun by Pope Eugenius III (1145–53), and has been enlarged and embellished by many subsequent popes down to the last one (Pius X). It now possesses twenty courts, and, it is said, 11,000 rooms of one sort or another. Immense treasures are stored up in it. Here are celebrated collections of pictures of many of the great masters, and museums in which all periods of the arts are represented by many of their most perfect productions. Among its noblest art treasures are the frescoes on the ceiling of the Sistine Chapel, painted by Michael Angelo, and consisting of scenes and figures connected with sacred history; and the frescoes painted by Raphael on the ceilings and walls of certain apartments known as Raphael's *stanze*, the subjects being biblical, allegorical, etc. Since the return of the popes from Avignon, the Vatican has been their principal residence, and here the conclaves always meet for the election of new popes. The *Vatican Library* was first constituted by Pope Nicholas V (1447–55), and was added to and enlarged by Leo X, Pius IV, Pius V, and other popes. The most important part of the library is the manuscript collection, which is said to contain about 25,600 MSS. The number of printed volumes has been estimated at from 150,000 to 220.000, including 2500 fifteenth-century editions, and a great number of bibliographical rarities.

Vatican Codex. See *Codex*.

Vatican Council, the Ecumenical Council of the Church of Rome which met in the Vatican in 1870, under Pope Pius IX, and declared the personal infallibility of the pope when speaking *ex cathedrâ* to be a dogma of the Church.

Vattel, EMRICH VON (fon vat-tel'), a celebrated Swiss jurist and writer, born in Neufchâtel in 1714; died in 1767. His great work was *The Right of Natives, or the Principles of Natural Law Applied to the Conduct and Affairs of Natives and Sovereigns.* This has been published in numerous editions and translated into the principal European languages.

Vauban (vō-bäṅ), SÉBASTIEN LE PRESTRE, SEIGNEUR DE, Marshal of France, and the greatest military engineer of that country, descended of an ancient and noble family, was born in 1633, and early entered the army, where he rose to the highest military rank by his merit and services. He was made governor of the citadel of Lille in 1668, commissioner-general of fortifications in 1677, and marshal of France in 1703. He died at Paris in 1707. As an engineer he carried the art of fortification to a degree of perfection unknown before his time. He strengthened and improved above 300 citadels, erected thirty-three new ones, and directed fifty-three sieges.

Vaucluse (vō-klüz), a department in the southeast of France; area, 1381 sq. miles. It is rugged and mountainous in the east, but more than one-half of the whole surface is arable, and vineyards occupy about one-sixth of this portion. The mulberry (for the rearing of silk-worms) and olive are extensively cultivated, and much attention is paid to the culture of aromatic and medicinal plants. Vaucluse takes its name from the valley and village of that name, celebrated by Petrarch. Avignon is the capital. Pop. (1906) 239,178.

Vaud, or PAYS-DE-VAUD (pe-e-dė-vō; German, *Waadt* or *Waadtland*), a western canton of Switzerland; area, 1244 sq. miles. It has three mountain systems — the Alps in the southeast, the Jura in the west, and the Jorat in the south, connecting the other two. Vaud belongs partly to the basin of the Rhine and partly to that of the Rhone. The soil is moderately fertile; and the vine is extensively cultivated in the south. There are no manufactures of importance. The inhabitants are mostly Protestants. Vaud became a canton of

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the Swiss Confederation in 1803. The capital is Lausanne. Pop. 281,379.

Vaudeville (vȧ'de-vil), a term first applied to the Norman folk-song of the fifteenth century, which originated with Oliver Basselin, who lived in the val or Vau de Vere. The folk-song led to a series of plays interspersed with songs, and known as Vaudevilles, occasionally as Virelais. The word is now applied to light theatrical entertainments.

Vault, in architect re, a continued arch, or an arched roof, so constructed that the stones, bricks, or other material of which it is composed sustain and keep each other in their places.

1, Gothic Groined Vault. 2, Spherical or Domical Vault.

Vaults are cylindrical, elliptical, single, double, cross, diagonal, Gothic, etc.

Vaux (vȧks), CALVERT, landscape architect, born at London in 1824, came to the United States in 1848. With L. L. Olmstead he devised the plans for Central Park, New York, and the Metropolitan Museum and the State Reservation at Niagara. He died in 1895.

Vector (vek'tẽr), in mathematics, the name given to any quantity which involves direction as well as magnitude. The simplest example is the position of one point with respect to another, fully represented by the straight line joining them. Other vector quantities are velocity, force, electric induction, etc.

Vedanta Philosophy (ve-dan'tȧ), a system of Brahmanic philosophy, first set forth in a work called the *Vedânta*, said to have been written more than two thousand years ago, and described as containing the quintessence of the *Vedas*. This system is based, like that of the Eleatics among the Greeks, upon the unity of all real existence. The sole real existence is denominated knowledge (*jnâna*), soul, or God. The multiplicity of individual life and variety of external life in the universe is merely phenomenal, and has all proceeded from the one real being by the exercise of the power of ignorance (*ajnâna*), which may be vanquished by a religious and ascetic mode of life, or by meditation on the one supreme spirit, Brahma, and by the extinction of all consciousness of outward things.

Vedas (vā'daz; from the Sanskrit root *vid*, meaning 'know'), the oldest of the Shastras or sacred writings of the Brahmans, and the oldest compositions in the Sanskrit language. Their date is unknown. Sir W. Jones fixes it at 1500 B.C., and Ritter at 1400 to 1600 B.C. They are four in number, called respectively the *Rig, Yajur, Sâma,* and *Atharva Veda.* All the Vedas are believed to be inspired, and are held by the Brahmans in the highest respect. The religious system of the Vedas is at bottom monotheistic. It derives a polytheistic appearance from the mention of the deity by various names according to the difference of his manifestations and attributes (Sûrya, Mitra, etc., the sun: Soma, the moon; Agni, fire; Indra, the firmament, etc.), but the unity of the supreme being is expressly asserted in more than one passage. Each of the Vedas is divided into three parts: the first called the *Sanhitâ*, a collection of hymns and prayers called *mantras* or *gânas;* the second, *Brâhmana,* which relates chiefly to ritual; and the third, the *Jnâna* or *Upanishads,* which is the philosophical portion of the work. The Upanishads are sometimes called collectively the *Vedânta.* The *Rig-veda* is the oldest of the Vedas, and the *Atharva-veda* the latest. Some scholars question whether the latter should be regarded as a Veda. Varying greatly in age, the Vedas represent many stages of thought and worship, the earliest being the simplest, the later following and reflecting the development of the Brahmanical system, with all its superstitions and rites.

Veddahs (ved'daz), a wild, semi-savage race, about 400 in number, residing in the interior of Ceylon, and said to be a remnant of the aborigines of Ceylon. The forest Veddahs live in trees and caves and subsist on game, which they kill with rude bows and arrows. The village Veddahs dwell in certain districts, but hold slight intercourse with the other inhabitants. The two tribes do not intermarry, and they have their own chiefs whom they elect and obey.

Vedder (ved'er), ELIHU, painter, born at New York in 1836. He became a student in Italy, and finally made that country his permanent residence. His works are frequently marked by a mystical and poetical quality and are highly suggestive. His best pictures are *The Lair of the Sea Serpent, A Venetian Dancing Girl, The*

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Death of Abel, and *An Arab Listening to the Sphinx*. His illustrations of Fitzgerald's translation of the *Rubaiyat* of Omar Khayyám (1884) won great praise.

Vega Carpio (vā'gà kar'pē-ō), Felix Lope de, a Spanish poet and dramatist, born at Madrid in 1562 of poor but noble parents; died there in 1635. After studying at Alcalá he became the secretary of the Duke of Alva. In 1582 he joined the army, and in 1588 accompanied the Invincible Armada. After being twice married and twice a widower, he in 1609 became a priest, and subsequently entered the order of St. Francis. He had already published various poems, but his dramatic and poetical productions were now multiplied with extraordinary rapidity. He enjoyed an immense popularity, and received marks of distinction from the King of Spain and Pope Urban VIII. About three hundred of his dramatic works have been printed. They reveal an inexhaustible but ill-regulated imagination, a strong mixture of the sublime and the ridiculous, and extraordinary facility in versification. He wrote altogether upwards of eighteen hundred comedies, but only some four hundred and fifty are extant in print or manuscript.

Vegetable Chemistry, the department of organic chemistry which investigates the chemical compounds found in vegetables. These compounds are chiefly made up of carbon, hydrogen, oxygen and nitrogen, but potash, soda, lime, and other substances are occasionally present in small and variable quantities. Sugar, starch, gum, and other distinct compounds existing already formed in plants, and capable of separation without suffering decomposition, are called *proximate* or *immediate principles* of vegetables. *Proximate analysis* is the separation of a particular principle from others with which it is mixed. *Ultimate analysis* consists in the reduction of the proximate principles to their simplest parts. The more important classes of compounds to be obtained from vegetables are acids, alkalis or alkaloids, oils and resins. Coloring matter, tannin, albumen, gluten, yeast, and other substances are also obtained. Of the acids the chief are acetic acid or vinegar, oxalic, tartaric and benzoic acids. The alkaloids are organic bases which produce remarkable toxicological effects. During the germination of seeds there is a conversion of starchy matter into sugar. The nutrition of plants may be regarded as depending upon solar energy, organic and mineral constituents, and water. See *Botany*.

Vegetable Ivory, the name which is applied to the kernels of the nuts (*corozo-nuts*) produced by the *Phytelephas macrocarpa*, a palm growing in South America. It is very hard and compact, has the appearance of ivory, and may be turned in the lathe, being used for buttons, umbrella handles, etc. The stem of the palm is extremely short, but the leaves rise to the height of 30 or 40 feet.

Vegetable Marrow, a species of gourd cultivated as a culinary vegetable, and used fried, boiled, or otherwise. See *Squash*.

Vegetable Physiology, the functional activities of plants. These include the functions of *germination; respiration*, as shown in the inhalation of oxygen and exhalation of carbon dioxide; *transpiration*, the vaporization of water by the heat yielded in respiration; *assimilation*, the taking in of carbon under the influence of sunlight, a process the reverse of respiration; *absorption*, the intaking of water from the air and soil; *metabolism*, the formation of complex organic substances from the simple chemical elements; *growth; plant movements; reproduction*, and other processes of a physiological character.

Vegetarianism (vej-e-tā'ri-an-izm), the theory and practice of living solely on vegetables. The doctrines and practice of vegetarianism are as old as the time of Pythagoras, and have for ages been strictly observed by many of the Hindus; and of late years the practice of subsisting solely upon vegetable food has come prominently before the public in connection with dietetic reform.

Veii (vē'yī). See *Camillus* and *Rome*.

Vein (vān), in mining, a crack or fissure in a rock, filled up by substances different from the rock, and which may either be metallic or non-metallic. Veins are sometimes many yards wide, having a length of many miles, and they ramify into innumerable smaller parts, often as slender as threads. Metallic veins are chiefly found in the primary, and lower and middle secondary rocks.

Veins (vānz), a system of membranous canals or tubes distributed throughout the bodies of animals for the purpose of returning the impure blood to the heart and lungs, after it has been conveyed to the various parts

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by the arteries. They are not elastic and have no pulsation (thus differing from the arteries), the motion of the blood in them being mainly secured by pressure of the moving parts between which they are embedded, the backward flow of the blood being prevented where necessary by a series of valves which permit a current only towards the heart. The veins at their farthest extremities form capillaries which collect from the tissues the blood brought by the arterial capillaries. These minute branches unite to form veins, which similarly unite in turn, forming gradually larger branches and trunks as they approach the heart. The venous blood from the head, neck, and upper limbs is all returned to the heart by one great vein, the *vena cava superior*, while that from the lower limbs and belly is returned by the *vena cava inferior*. The portal vein (*vena portæ*) receives the venous blood from the intestines and conveys it through the liver to the vena cava inferior. From each lung to the heart come two pulmonary veins carrying back the blood that has been purified in the lungs, after being carried to them by the pulmonary artery. See *Heart*.

Velasquez (ve-lâs'keth), or in full DON DIEGO RODRIGUEZ DE SILVA Y VELASQUEZ (or VELAZQUEZ), an eminent Spanish historical and portrait painter, was born at Seville in 1599. He studied first under Francisco Herrera the elder, and afterwards under Francisco Pacheco. He was appointed principal painter to Philip IV in 1623. In 1629 he went to Italy, where he closely studied the works of Michael Angelo, Raphael, and Titian. On his return to Spain in 1631 he was received with great distinction, and in 1658 the king raised him to the dignity of a noble. He died in 1660. His compositions exhibit strong expression, freedom of pencil, and admirable coloring. Among his best works are the *Aguador*, or 'Water Carrier'; the *Orlando Muerto;* a *Nativity*, or *Adoration of the Shepherds;* the *Brothers of Joseph; Moses Taken from the Nile;* portraits of Philip IV and of Elizabeth his queen, Pope Innocent X, and other dignitaries; and many pictures from history and from common life.

Velde (vel'de), ADRIAN VAN DER, a celebrated Dutch landscape painter and engraver, was born at Amsterdam in 1635, and died in 1672. He came under the influence of Wouverman, and excelled in pastoral scenes, which he executed in admirable drawing and color. He also painted some large historical and religious pieces, and etched a number of plates.— His father, WILLEM VAN DER VELDE the Elder, was born at Leyden in 1610. He was originally bred to the sea, but afterwards studied painting, and early became distinguished for his excellence in marine subjects. He entered the service of Charles II of England. He chiefly painted in black and white, and is said to have been present at several seafights in order to sketch the incidents. He died at London in 1693.— Another son, WILLEM VAN DER VELDE, the Younger, was born at Amsterdam in 1633, and painted the same class of subjects as his father, whom he surpassed. He also entered the service of Charles II. His principal works are chiefly to be found in the royal collections and cabinets of England. He died at London in 1707.

Velella (vel-el'a), a curious genus of cœlenterate animals, of the class Hydrozoa, order Physophoridæ, and represented by free-swimming oceanic forms, which occur around the British coasts, but more frequently in warm seas. The best-known member, *Velella vulgāris*, or 'Sallee Man,' is about 2 inches in length by 1½ in height. It is of a beautiful blue color and semitransparent, and floats on the surface of the sea with its vertical crest exposed to the wind as a sail.

Velez-Malaga (vā'lāth mă'lā-gă), a city of Spain, in Andalusia, province of Malaga, on the Velez, 1½ miles from the Mediterranean, and 14 miles N. E. of Malaga. The district is very fertile, and produces sugarcane, maize, etc. Pop. 23,586.

Velino (vā-lē'nō), a small stream of Central Italy, a tributary of the Nera, at its junction with which it forms beautiful falls about 650 feet high. See *Terni*.

Velleius Paterculus. See *Paterculus*.

Velletri (vel-lā'trē), a town in Italy, province of Rome, and 21 miles southeast of Rome. The chief buildings are the cathedral, a handsome Gothic structure rebuilt in 1660; the town-hall, built from the designs of Bramante; and the palaces Lancellotti or Ginetti, and Borgia. Pop. 14,243.

Vellore (vel'lōr'), a town and fort of India, presidency of Madras, district of North Arcot, on the Palâr River. The town has a Vishnuite temple, mosque, military offices, church, missions, a hospital, barracks, etc. Pop. 43,537.

Vellum. See *Parchment*.

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Velocipede (ve-los'i-pēd), a light vehicle or carriage impelled by the feet of the rider himself. One of the older forms of this carriage consisted of two wheels of nearly equal size, placed one before the other, and connected by a beam on which the driver's seat was fixed. The rider, sitting astride the machine, propelled it by the thrust of each foot on the ground. This form dates from the early part of the last century. In the latter half of the century treadles operating cranks on the axle of the front wheel came into use, and soon many modified and improved kinds became popular under the name of the bicycle and tricycle. See *Bicycle*, *Tricycle*.

Velocity, the rate at which a body changes its position in space. Velocity is popularly expressed as so many miles per hour, or as so many feet per second. The velocity of a body is *uniform* when it passes through equal spaces in equal times, *variable* when the spaces passed through in equal times are unequal, *accelerated* when it passes through a greater space in equal successive portions of time, as is the case of falling bodies under the action of gravity, and *retarded*, when a less space is passed through in each successive portion of time. *Angular velocity* is such a velocity as that of the spoke of a wheel, being measured as a number of angles of a specified extent (as right angles) divided by a measure of time in specified units. See *Fall of Bodies*, *Dynamics*, *Projectiles*, *Motion*, etc.

Velvet (vel'vet), a rich silk stuff, covered on the outside with a close, short, fine, soft shag or nap. In this fabric the warp is passed over wires so as to make a row of loops which project from the backing, and are thus left, by withdrawing the wire, for an uncut or *pile* velvet, but are cut with a sharp tool to make a *cut* velvet. Florence and Genoa have been long noted for the manufacture of velvet, but Lyons, in France, is now its principal seat. Cotton and woolen fabrics woven in this manner are called *velveteen* and *plush* respectively.

Vendace (ven'dās), a species of fishes, of the family Salmonidæ, genus *Coregŏnus* (*C. Willoughbii*), found in Europe in some of the rivers and lakes of Britain and Sweden. The average length is about 6 to 7 inches. The fish is esteemed a great delicacy, and is taken with the sweep-net about August.

Vendée (vän-dā), a western maritime department of France; area, 2595 sq. miles. The surface is much diversified, and is watered in the north by tributaries of the Loire, and in the south by the Lay and tributaries of the Charente. The principal crops are grain, flax, and hemp; and a white wine is also produced. Capital, La Roche-sur-Yon. At the time of the revolution the Vendéans espoused the royalist cause, and, inspirited by La Rochejaquelein, Cathelineau, and other leaders, and aided by the hilly and wooded nature of the ground, they resisted the republicans with varied success from 1793 to 1796, when the rising was completely quelled by the activity of General Hoche. In 1799–1800, and again in 1814 and 1815, some risings took place in favor of the Bourbons, but they were quickly suppressed. Pop. (1906) 442,777. See *Chouans* and *La Rochejaquelein*.

Vendémiaire (vän-dā-mi-ār; that is, 'vintage month'), the first month in the French revolutionary calendar, from September 22 to October 21. See *Calendar*.

Vendetta (ven-det'a; an Italian word from L. *vindicta*, revenge), a blood-feud; the practice of the nearest of kin executing vengeance on the murderer of a relative. In Corsica the vendetta is regarded as a duty incumbent on the relatives of the murdered man, and, failing to reach the real murderer, they take vengeance on his relatives. The practice exists, although to a more limited extent, in Sicily, Sardinia and Calabria, as well as among the Druses, Circassians, Arabs, etc.

Vendôme (vän-dōm), a town of France, in the department of Loir-et-Cher, on the Loir. It is regularly and well built, and contains a fine old church. Pop. (1906) 7381.

Vendôme, Louis, Duke of, the celebrated general of Louis XIV, was the grandson of César, eldest son of Henry IV and Gabrielle d'Estrées. He was born in 1654, early entered the military service, and received, in 1702, the command of the French army in the war of the Spanish Succession. After having distinguished himself in Italy, Tyrol, and Belgium, the Duke of Burgundy was placed over him; and the disagreement of the two commanders caused the defeat of the French at Oudenarde (July 11, 1708). Vendôme was recalled. Soon after being placed in command in Spain he gained several distinguished successes, but died in 1712. His brother, Philip, was grand prior of the order of the Knights of Malta in France. He was born in 1655, served in the Spanish war of Succession, and died in 1724.

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Veneer (ve-nēr'), a thin layer of choice hard wood, such as mahogany, rosewood, maple, etc., glued to the surface of wood of a commoner sort, such as fir or pine, so as to give the whole the appearance of being made of the more valuable material. It is mostly used for furniture, and owing to recent improvements in sawing machinery, layers as thin as paper can be obtained.

Venesection. See *Phlebotomy.*

Venetian Architecture (ve-nē'-shan), VENETIAN GOTHIC, that style of Italian architecture employed by the Venetian architects from the fifteenth to the early part of the seventeenth century. The principal characteristics are: each story is provided with its own tier of columns or pilasters, with their entablature, and separated from the other stories by conspicuous friezes or belts, often in the form of balustrades broken by pedestals and ornamented by figures; arched windows ornamented with columns, the spandrels being often filled with figures; ornamental parapets are common; and the whole has a rich and varied effect. This style of architecture is characterized by Fergusson as "Gothic treated with an Eastern feeling, and enriched with many details borrowed from Eastern styles."

Venetian School, in painting, that school which counts among its masters Titian, Paul Veronese, Giorgione, Tintoretto, and many other illustrious names. See *Painting.*

Venezuela (ven-e-zwē'lâ), a northern republic of South America, bounded by the Caribbean Sea, British Guiana, Brazil, and Colombia; area, 599,538 square miles. The Andes enter Venezuela from the west in two branches; the western branch has a moderate elevation, rarely exceeding 4000 feet, but the eastern branch, which is about 300 miles long by 60 miles broad, has an average altitude of 12,000 feet, culminating in Sierra-Nevada-de-Merida with summits attaining 15,000 feet. There are other branches running northeast and parallel to the north coast, and in the south, on the frontiers of Guiana, are the mountains of Parima. From these mountains to the coast chain at Caracas, and from the Andes to the mouth of the Orinoco, extend vast plains (or llanos) with an area of 300,000 sq. miles. The chief rivers are the Orinoco and its affluents; the principal lakes are Maracaibo and Tacarigua. The climate is equatorial in character, and the seasons are distinguished into the wet and the dry. It is not unhealthy on the whole. The greater part of Venezuela is liable to earthquakes. The valleys and tablelands of the coast mountains are the chief seats of cultivation. The region of palms extends from the sea-level to the height of 3300 feet; mingled with the palms are cacti, mimosæ, the pineapple, the milk tree, mahogany, and trees yielding caoutchouc, sarsaparilla, copaiba, and other drugs. Above 2000 feet are the forests of cinchona or Peruvian-bark tree, the vanilla, plantain, etc. All the grains of temperate regions attain perfection at an elevation of 8000 feet. Cultivated plants include the cacao, cocoanut, tobacco, maize (two crops yearly), cotton, coffee, sugar and indigo. Among the minerals are gold, silver, tin and copper; good coal is found in the coast districts; asphalt and petroleum abound round Lake Maracaibo. The gold mines are now being worked by English and other capital. The wild animals include the jaguar (now rare), puma, tapir, ounce, monkeys, serpents, alligators, the manatee, etc. The population is of Spanish, Indian and Negro origin, either of pure or mixed blood. More than half the population are mestizoes, mulattoes and other mixed breeds. Venezuela was formerly divided into twenty states, four territories, and a federal district, but a readjustment in 1904 reduced the number of states to thirteen, and made the territories five. The Republic of Venezuela was formed in 1831 by secession from the other members of the free state founded by Bolivar. (See *Colombia.*) The capital is Caracas. The chief ports are La Guayra, Puerto-Cabello, Maracaibo and Ciudad Bolivar. Discovery of gold led Great Britain to claim that the boundary of British Guiana extended to the Orinoco, thus including the gold fields. Upon Venezuela's protest, and at the instance of the United States government, the dispute was arbitrated by the Congress at The Hague, and a satisfactory adjustment made. Columbus reached the coast of Venezuela in 1498, and it was visited by Ojeda and Vespucci in 1499. It was settled by Spain, but a struggle for independence begun in 1810, resulted in its freedom and formation into a federal republic. As in Latin America generally it has been the scene of many rebellious outbreaks, and under its recent president, Castro, it came into hostile relations with several foreign nations, Castro disregarding his commercial engagements. This gave dissatisfaction among the people, and, in De-

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cember, 1908, during a visit to Europe, he was deposed, Vice-President Gomez being installed in his place. Pop. 2,591,000.

Venice (ven'is; Italian, *Venezia*), a city and seaport of Northern Italy, capital of the province of the same name, on a number of islets in a shallow lagoon in the northwest of the Adriatic, 23 miles east of Padua by rail. The islets are very low, and the houses are mostly supported on piles. A railway viaduct nearly 2½ miles long connects the town with the mainland. The city is divided into two parts by the Canalazzo or Grand Canal, spanned by an elegant bridge, the Rialto, and several lesser bridges. The numerous branch canals are crossed by about 380 bridges, which rise rapidly towards the center to afford passage to the gondolas and other boats. The city is also intersected by *calli* or

narrow lanes for pedestrians: but the canals are really the streets of Venice, and it possesses neither horses nor wheeled carriages. Near the center of the city there is one street about 18 feet wide, the Merceria, but the great center of business and amusement is the Piazza, or Square of St. Mark, and the piazetta adjoining it. The Piazza is about 570 feet long by 200 broad, contains some of the more remarkable public buildings, and is lined with handsome shops and cafés. The piazetta faces the sea. The Palace of the Doges, reconstructed by Marino Falieri in 1354, abuts on the piazetta. It is in the Venetian Gothic style, and has two of the sides resting on double ranges of arcades. It contains a number of beautiful halls, some with ceilings and walls painted by Tintoretto, Paolo Veronese, and other distinguished masters. The Ponte-dei-Sospiri (Bridge of Sighs) connects the palace with the public prisons on the opposite side of a narrow canal. The church of St. Mark, now the cathedral (erected 976–1071), is in the Romanesque-Byzantine style, and is surmounted by five domes. The principal front is adorned with 500 columns of precious marbles, and the interior is lavishly decorated. Above the doorway are the four celebrated bronze horses brought from Constantinople by the Doge Dandolo in 1204. Other notable churches are Santa-Maria-Gloriosa-de'-Frari (thirteenth century), containing the tomb of Titian, and numerous works of art; San Giovanni-e-Paolo; and Il-Santissimo-Redentore, one of Palladio's finest structures. Of the numerous palaces the chief are the Palazzo-Reale; the Palazzo-Giustiniani; the Palazzo-Contarini-Fasan, restored in 1867; and the Palazzo-Corner della-Cà-Grande, now the seat of the government authorities. The remaining public buildings include the Accademia delle Belli Arti, containing works by Titian, Giorgione, Tintoretto, Paolo Veronese, and others; the Dogano, or custom-house; the arsenal; the Zecca, or mint; etc. The chief manufactures are woolen cloth, cloth of gold and silver, velvet, lace, ornamental and colored glass, mosaic, jewelry, castings, etc. The trade is extensive; the imports include colonial goods, dye-woods, coal, iron, oil, etc.; exports, timber, rice, linen, glass, coral, etc. The harbor is spacious, but the entrances are shallow.— Venice is supposed to have been founded in the fifth century by inhabitants of the surrounding districts, who took refuge from the cruelty of Attila on the islets at the mouth of the Brenta. In 697 Pauluccio Anafesto was elected the first doge or duke, and in 819 the seat of government was removed from Malamocco to Rivoalto (Rialto), and the adjacent islands were connected by bridges. The Crusades (1096–1271) greatly increased the wealth and power of the Venetians by giving employment to their shipping. In 1204 the Doge Enrico Dandolo conquered Constantinople, and upon the division of the Byzantine Empire Venice received a large accession of territory. Under Dandolo's successors the Venetians gradually lost all their mainland possessions. But in 1386 they captured Corfu, Durazzo, Argos, etc.; in 1405 their general, Malatesta, conquered Vicenza, Belluni, Verona, and Padua: and besides these and other conquests on land, the Venetian fleet defeated the

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Turkish at Gallipoli in 1416, and in 1421 subjugated all the towns along the Dalmatian coast. At the close of the fifteenth century Venice had a population of 200,000, and was the center of activity of the commerce of Europe. Its power then began to decline, its commerce was gradually superseded by that of the Portuguese, and in 1508 a league to subdue the republic was formed at Cambrai between Pope Julius II, the Emperor of Germany, and the kings of France and Spain. All its possessions on the mainland were taken, and the work of destruction was all but completed by warfare with the Turks at intervals from 1649 to 1718. The French took possession of the city in 1797. It subsequently became part of the Austrian Empire, of Napoleon's kingdom of Italy, and from 1815 to 1866 of the Lombardo-Venetian Kingdom under Austria. In 1866 the city and province were ceded to Napoleon III, Emperor of France, under whose auspices they were united by a plebiscite to the Kingdom of Italy. Pop. 169,563.

Venice, Gulf of. See *Adriatic Sea.*

Venire facias (ve-nī're fā'si-as; Latin, 'that you cause to come'), in law, a writ or precept directed to the sheriff, requiring him to *cause* a jury to *come* or appear in the neighborhood where a cause is brought to issue to try the same. This writ was abolished in England in 1852, but the precept issued by the justices of assize, which is substituted, is sometimes loosely spoken of as a *venire.*

Venlo (ven-lō'), a town of the Netherlands, province of Limburg, on the right bank of the Meuse. It has manufactories of needles and cigars. Pop. 15,000.

Venomous Animals, animals capable of inflicting poisonous wounds by means of special organs or contrivances. They include spiders, bees, wasps, hornets, scorpions, certain serpents, etc. In all cases the venomous matter must be introduced *directly* into the circulation to produce its effects.

Venosa (vā-nō'sȧ; anc. *Venusia*), a town of Italy, province of Potenza. It has a cathedral, and a castle dating from the fifteenth century. Horace was born here. Pop. 8503.

Ventilation (ven-ti-lā'shun). See *Warming and Ventilation.*

Ventimiglia (-mēl'yȧ), a town of Italy, province of Porto Maurizio, 7 miles east of Mentone. It is a bishop's see, and is surrounded by forts. Pop. 5659.

Ventnor (vent'ner), a watering-place of England, on the south-east shore of the Isle of Wight, in the district of Undercliff. It has many accommodations for visitors and a good beach for bathing. Pop. 5787.

Ventose. See *Calendar.*

Ventricle. See *Heart.*

Ventriloquism (ven-tril'u-kwizm), the art of speaking in such a way as to cause a hearer to believe that the sound comes, not from the person speaking, but from a different source. The name (Latin, *venter*, belly, and *loqui*, to speak) originated from the erroneous supposition that the sounds uttered were formed in the belly, whereas practice alone is necessary to carry this act of illusion to a high degree of perfection. The sounds are formed by the ordinary vocal organs — the larynx, the palate, the tongue, the lips, etc. The art of the ventriloquist consists merely in this: — After drawing a long breath he breathes it out slowly and gradually, dexterously modifying and diminishing the sound of the voice; besides this he moves his lips as little as possible, and by various contrivances diverts the attention of his auditors. This art was known to the ancient Greeks.

Venue (ven'ū), in English law, the place, that is, the county, where an action is to be tried, and from whence juries are to be summoned for trial of causes. The venue, in all cases, civil and criminal, may be changed for sufficient cause.

Venus (vē'nus), the Roman name of the goddess of love, called by the Greeks Aphroditē. In the Iliad she is described as the daughter of Zeus and Diōnē; but Hesiod represents her as the offspring of Urānus, born among the foam (Greek, *aphros*) of the sea. She surpassed all other goddesses in beauty, and hence received the apple which was to be awarded to the most beautiful by Paris. She was the wife of Hephæstos (Vulcan), but also bestowed her love on the gods Arēs (Mars), Dionysus (Bacchus), Hermes (Mercury), and Poseidon (Neptune), and the mortals Anchises and Adonis. The myrtle, rose, poppy, apple, and other fruits were sacred to her, as were also the dove, sparrow, swan, swallow, ram, hare, and tortoise. The chief places of her worship in Greece were the islands of Cyprus and Cythera. In Rome several temples were erected to her under different names. In the best

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days of art this goddess was always represented draped, in later times nude. The scene of her arising from the sea was sculptured by Phidias on the base of the statue of Zeus at Olympia, and one of the most famous pictures of Apelles represented the same subject. The Venus of Capua and the Venus of Milo represent her as Venus Victrix, with one foot on a helmet and raising a shield. The Venus de' Medici is supposed to be a free copy of a statue of her by Praxiteles, which was celebrated above all her other statues in ancient times. Among modern statues of Venus, one of the most famous is that by Canova, in which she is represented as issuing from the bath.

Venus, antique statue in the British Museum.

Venus, one of the inferior planets, having its orbit between Mercury and the earth, and the most brilliant of all the planetary bodies. From its alternate appearance in the morning and evening it was called by the ancients *Lucifer* and *Hesperus*, the morning and evening star. The mean distance of Venus from the sun is about 66,134,000 miles, its diameter 7510 miles, and its period of revolution round the sun about 224.7 mean solar days. Its volume is equal to about $\frac{171}{100}$ths of the earth, but its density being slightly greater its mass is actually equal to about $\frac{177}{100}$ths of the earth. It probably revolves about an axis, in a period of about 23 hrs. 21 min., the axis of rotation being inclined to the ecliptic at an angle of about 75°. According to its various positions relatively to the sun and earth it exhibits phases like the moon. Like Mercury, Venus transits the face of the sun, but at longer intervals. The transits of Venus are of much more importance than those of Mercury, because, being nearer to us when in transit, its position on the sun is measurably different for observers placed on different parts of the earth. See *Transit*.

Venus' Fly-trap. See *Dionæa*.

Vera Cruz (vā'rā krös), the chief seaport of Mexico, and capital of a state of the same name. The harbor is merely an open, unsafe roadstead, but there is a large trade. The town has broad and regular streets, and some good buildings, and is defended by the fortress of San-Juan-de-Ulloa on an island in front of the harbor. The situation of the town is exceedingly unhealthy. It was founded by Cortez in 1520 and was captured by General Scott in 1847. Pop. 48,633.—The state stretches along the s. w. part of the Gulf of Mexico; area, 29,285 square miles. The products embrace all kinds of grain crops, tobacco, sugar, cotton, fruits, dyewoods and timber. Cattle, horses and sheep are numerous. Pop. 981,030.

Veratrin (ve-rā'trin), or **Verat'ria** ($C_{37}H_{53}NO_{11}$), a vegetable alkaloid found in *Veratrum Sabadilla*, *Veratrum album*, etc. It is generally obtained as a crystalline powder, nearly white, very acrid and poisonous, insoluble in water, but very soluble in alcohol. In the form of tincture, and still more in that of ointment, veratrin is much used as an external application in cases of neuralgia and obstinate rheumatic pains. The smallest quantity entering the nose causes violent and even dangerous sneezing.

Veratrum (ve-rā'trum), a well-known genus of plants belonging to the nat. order Melanthaceæ. *Veratrum album* (common white hellebore) is a native of most alpine meadows in the southern, central and northern parts of Europe. It has large plaited leaves, erect stems, and large panicles of greenish flowers. It yields the substance veratrin (which see). Every part of both is acrid and poisonous, especially the rhizomes. The *V. viride* of North America (American hellebore) is an acrid emetic, and acts strongly in lowering the action of the heart.

Verb, in grammar, that part of speech whose essential function is to predicate or assert something in regard to something else (the subject or thing spoken of); as, the boy *runs*, the man *lifts* the stone, fishes *swim*, he *suffers* much. Verbs usually have the power of indicating time and mode by means of tenses and moods, these varying in the different languages, as does also the *conjugation* or system of verbal inflections and forms as a whole. They have been divided into *active* and *neuter verbs*, according as they predicate action or state. Active verbs are divided into *intransitive* and *transitive*, according as the action is confined to the actor or passes from

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him to an object. Intransitive verbs often take an objective of their own nature; as, he *runs* a race; he *sleeps* the sleep of death. When a verb may be used either transitively or intransitively, as he *walks* the horse, he *walks* to church, the verb in the former use is said to be *causative*. Many causative verbs are distinguished from their corresponding intransitives by a change of form, as *sit, set; lie, lay; fall, fell*. *Passive verbs* affirm suffering or endurance of what another does. Hence, only verbs which take an object after them can have a passive voice, because it can be said of objects only that they suffer or endure the action directed on or towards them by the subject of the active verb. Passive verbs are thus the correlatives or complements of active verbs.

Verbascum. See *Mullein*.

Verbena (ver-bē'na), a genus of plants, the type of the nat. order Verbenaceæ. Most of the species are American; about seventy are enumerated. *V. officinālis* (common vervain), a plant widely distributed, was once held in great repute for its medicinal virtues, and entered into the composition of various charms and love philters. Several species are cultivated for the great beauty of their flowers, being fine border plants. The verbena of the perfumers is the lemon-grass, from which the 'oil of verbena' is extracted.

Verbenas — Garden varieties.

Verbenaceæ (ver-be-nā'se-ē), a nat. order of plants, consisting of trees, shrubs, and herbaceous plants common in the tropics of both hemispheres, but rare in Europe, Asia and North America. They have generally opposite or whorled, simple or compound leaves without stipules; flowers in opposite corymbs, or spiked alternately, sometimes in dense heads, seldom axillary or solitary. The verbena and teak are examples.

Vercelli (ver-chel'lē), a town of North Italy, province of Novara, near the right bank of the Sesia, 44 miles W. S. W. of Milan by rail. It has a modern cathedral, a castle, now converted into courts of justice; hospital, cavalry barracks, etc., flourishing manufactures and trade. Pop. 17,922.

Verd-antique (verd-an-tēk'), in mineralogy, an aggregate of serpentine and white crystallized marble, having a greenish color. It is beautifully mottled, takes a fine polish, and is much used for ornamental purposes. The term is also given to a green incrustation on ancient coins, brass or copper. *Oriental Verd-antique* is a green porphyry used as marble.

Verden (fär'dĕn), a town of Prussia, in Hanover, on the Aller, 21 miles S. E. of Bremen. It has a fine Gothic cathedral, a gymnasium, breweries, distilleries and manufactories of cigars. Pop. 9842.

Verdi (ver'dē), GIUSEPPE, an Italian operatic composer, born in 1814. His first production was *Oberto, Conte di San Bonifazio* (1839), and in 1842 he brought out with great success at the La Scala, Milan, his *Nabuco*, followed by *I Lombardi* (1843), *Ernani* (1844), *Rigoletto* (1851), *Il Trovatore* (1853), *La Traviata* (1853), *Un Ballo in Maschera* (1869), *Aida* (1871), *Montezuma* (1878), and *Otello* (1886). Verdi had a fine dramatic gift, and his melodies are showy and taking. He died in 1901.

Verdict. See *Jury*.

Verdigris (ver'di-gris), a poisonous substance, prepared by exposing copper to the air in contact with acetic acid, and used as a pigment, as a mordant, in medicine, etc.

Verditer (ver'di-tĕr), a blue pigment prepared by dissolving verdigris in acetic acid.

Verdun (ver-dun), a town of France, department of the Meuse, 150 miles E. N. E. of Paris. It is a walled town defended by a citadel, the work of Vauban. The chief buildings are the episcopal palace, the barracks, and the public library. Verdun is famous for its liqueurs and confectionery, and it has breweries, tanneries, dye-works, etc. The Germans captured it in 1871 and vigorously besieged it in 1916. This siege was of such importance in the history of the European war that a special description of its purpose and general events is requisite to a just conception of this great conflict. It constitutes one of the leading phases of the war in its western field, paralleling the Battle of the Marne (*q. v.*) as a desperate effort to break through the French lines at a vulnerable point and expose Paris to peril of capture. Verdun was a specially hard point at which to smash the French line, being the strong-

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est of a series of fortified places facing the German frontier. An attack on it at the beginning of the war had led to great development in its outer defenses, so that it became rather a fortified area than a fort. Its fall, then, would have been so much the more serious for France, and the army under the German Crown-Prince was selected to undertake its capture.

A well-devised effort to take the city by surprise, one that nearly succeeded, was the method pursued. A series of violent attacks, extending widely along the western front, was made in the early weeks of 1916, which was intended to mislead the Allies as to the projected assault, Verdun being left at rest. These continued through late January and early February, Arras being specially their center, the indications being that a drive was about to be made upon Dunkirk and Calais. The French were next attacked in Champagne and at other points, while all remained quiet at the strong fortress on the Meuse. The result was a weakening of the garrison of Verdun. Suddenly, on the 23d of February, the storm broke, eight German army corps (300,000 men) taking part in it. These were hurled upon the weakened French lines with such impetuous force that in the first day's assault more than six miles of trenches were carried, the defenses being penetrated to a depth of nearly two miles, while 3000 French prisoners were taken. The second day added as much more to the captures, bringing the Germans from a distance of 8 miles to a point only 4½ miles from the fortress. The next day Fort Douaumont was taken and held firmly against the furious counter-attacks of the French. The purpose of the Germans had now become evident and troops were hurried to the danger point in all haste, the British taking over several miles of French trenches to permit this reinforcement. In the first six days the Germans claimed to have taken 16,800 prisoners and 78 cannon. But French resistance in this direction now stiffened, and the Germans found it advisable to shift to new points of attack. The first assaults on the left bank of the Meuse were made on March 6 and defensive points were carried there and during the following week, including the Forest of Cumières, but in the succeeding period the Germans were firmly faced.

Le Morte Homme (Dead Man's Hill) became a central point in the struggle in mid-March, both sides claiming its capture, though each referred to a different hill. Malancourt was taken by the Germans on March 31, and the village of Vaud and Caillette Wood. On April 5 Harcourt was captured and on the 6th Bethincourt fell into their hands. On the 11th Germany claimed a total of 36,000 French prisoners, but the loss of the Germans in their assaults on the French posts had been very heavy and their efforts now slackened, while the French began a series of counter-attacks, though with no marked change in the situation, losses and gains being successively made. Thus on May 22 the French recaptured part of Fort Douaumont and some trenches on Dead Man's Hill, but they lost their hold on the fort three days later and also the village of Cumières, west of the Meuse. Incessant assaults on the part of the Germans followed, with no marked gains, but on June 7, by a sudden shifting of the point of attack, Fort Vaux was captured. On the 23d, after two weeks of furious fighting, Thiaumont was taken by the Germans and by July 1 it had been lost and taken three times by either side, while on the 4th it again fell into German hands. The Somme drive had now been launched on the part of the Allies and it was hoped that this would lessen the German pressure on Verdun, but the attacks continued, though with no marked gains. For more than four months this great contest had continued and though the Germans had gained considerable territory and a number of the outlying forts, Verdun remained intact and the great effort to break through the French line had so far failed.

The fighting points now shifted to other sections of the long battle-line, and comparative quiet remained at Verdun until the end of October, when the policy of surprise shifted to the other side. An attack was made on October 24, and was so sudden and impetuous that the Germans were utterly overwhelmed. Not at a single point were they able to stop the furious rush. Douaumont and Thiaumont were wrested from their hands, the German line being broken over a front of 4 1-3 miles and penetrated to a depth of nearly two miles. Thus in three hours the French recaptured ground which it had taken the Germans months to capture and hold.

Verdun, a town of Quebec province, Canada, 1½ miles from Montreal. Pop. (1911) 11,629.

Vereshtchagin (ve-res-tchä'gin), Wasiliy, a Russian historical painter, born in 1842, and was educated at the naval school in St. Petersburg. In 1864 he entered the École des Beaux Arts at Paris, where Gerôme was his master. He joined the Caucasian expedition under General Kaufmann in 1867, and in 1869 went to

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Siberia. He took part in the Russo-Turkish war, and was wounded at Plevna. From that time on he visited all the chief cities of Europe exhibiting his pictures. He was drowned in the sinking of a Russian warship during the Russo-Japanese war in 1904.

Vergil. See *Virgil.*

Verjuice (ver'jōs), a sharp vinegar made of the juice of the crab-apple; also the sour juice of unripe grapes is used for culinary purposes.

Verlaine (ver-lān'), PAUL, French lyrical poet, born in 1844; died in 1896. In a quarrel with Rimbaud, he aimed a pistol and was imprisoned for two years. He left prison a devout Catholic. His poems are remarkably beautiful both in thought and rhythm.

Vermeer (ver-mār'), or JAN VAN DER MEER, OF DELFT, a Dutch painter, born in 1632; died in 1675. He was greatly influenced by Pieter de Hooch. His genre pictures are highly prized.

Vermejo (ver-ma'hō), or RIO GRANDE. See *Paraguay.*

Vermes (ver'mēz; Latin, 'worms'), the sixth class of animals in the Linnæan arrangement of the animal kingdom, comprising all animals which could not be arranged under Vertebrata and Insecta.

Vermicelli (-chel'lē; Italian, 'little worms'). See *Macaroni.*

Vermiform Appendix, a outgrowth from the intestines which, so far as is known, is peculiar to man, certain of the higher apes, and the wombat. The vermiform appendix in the human species hangs from the cæcum, which is the point of junction between the smaller intestines and the ascending colon. In size and shape it resembles a man's little finger. It is functionally useless to man and it appears to be the relic of an organ of utility to some of the lower animals. Its lining membrane secretes a mucus which in health constantly wells up into the lower end of the colon where the ileocæcal valve opens, and this mucus acts as a lubricant to the valve. The appendix is subject to inflammatory attacks arising probably from the ingestion of matter from the bowels. Attacks of this kind are somewhat frequent, the usual treatment being surgical, the diseased organ being removed. Lighter attacks are treated in remedial methods.

Vermifuge (ver'mi-fūj). See *Anthelminthics.*

Vermilion (ver-mil'yun), the name given to a pigment of a beautifully scarlet color, obtained from crystallized mercuric sulphide. It is extensively employed in painting, in making red sealing-wax, and other purposes.

Vermin (ver'min), obnoxious insects, as bugs, fleas and lice; troublesome animals, as rats and mice; game-destroying species, as weasels, polecats, also hawks and owls. The fox is called vermin, but not in a sense of disrespect.

Vermont (ver-mont'), one of the United States, bounded N. by Quebec, E. by New Hampshire (from which it is separated by the Connecticut River), S. by Massachusetts and W. by New York and Lake Champlain. Length 143 miles, width 40 to 85; area, 9564 square miles. The surface is traversed from south to north by the Green Mountains (French, *Verts Monts*), which culminate in Mansfield Mountain in the N. W., 4280 feet high. They are generally covered by dense forests, but afford excellent pasturage. The drainage is shared between Lake Champlain in the west, and the Connecticut and its affluents. The surface is generally fertile, the best soil being on the western slope of the mountains near the border of Lake Champlain. The climate is healthy, and the temperature ranges from 20° below zero in winter up to 90° in summer. Farming and grazing are the chief occupations, all the agricultural staples being abundantly produced, while the yield of maple sugar is nowhere equaled. Wool and dairy products are large and excellent, and cattle, sheep and horses are raised in large numbers. Vermont is the greatest breeding state for fine horses and for Spanish merino sheep. Manufactures are of much importance and cover a wide range of goods, including cotton and woolen goods, leather, bar and pig iron, machinery, etc. Large quantities of lumber are exported and there are extensive marble, granite and slate quarries. Rutland is the largest marble center in the world, and Barre the largest granite center. There is a considerable internal and transit trade, but the foreign trade is limited, being chiefly carried on through New York and Massachusetts. Vermont was first settled by emigrants from Massachusetts, and joined the Union in 1791, after the state of New York had renounced a claim to the territory for $30,000. Montpelier is the capital, but Burlington (1910) (pop. 20,463) is the largest town. Pop. 355,-956.

Vernal Grass (ver'nal; *Anthoxanthum odoratum*), sweet-scented pasture grass, that to

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which the odor of new-mown hay is chiefly due, growing in most of the States.

Vernation (ver-nā'shun), a botanical term, indicating the manner in which the leaves are arranged in the leaf bud. In some plants the leaves are placed together in a very simple method, in others they are curiously folded, rolled, or plaited and interlaced with each other, but so as to separate readily when the time for their expansion comes.

Verne (vern), JULES, a popular French romancer, born at Nantes in 1828. He studied law for some time, but afterwards began writing short pieces for the stage. In 1863 he published *Five Weeks in a Balloon*, and the vein of the marvelous, tinged with a quasi-scientific truthfulness, was afterwards worked by him with great success. His more popular works are: *Twenty Thousand Leagues under the Sea*, *From the Earth to the Moon*, *Across Africa in a Balloon*, *To the Center of the Earth*, and *Round the World in Eighty Days*. Most of his works have been translated into English and German. He died in 1905.

Vernet (ver-nā), JEAN ÉMILE HORACE, a French painter, grandson of Claude Joseph Vernet, a distinguished painter of sea pieces and seaport scenes; and son of Antoine Charles Horace Vernet, painter of battle and genre pictures. He was born in Paris in 1798; and died in 1863. His first master in art was his father, and at an early age he acquired the favor of the imperial court by his battle pieces, in which he adopted a realistic treatment in opposition to the classical school of David. His pictures connected with the wars of Napoleon are very numerous. In 1828 Charles X appointed him director of the French Academy in Rome, a post he ably filled till the end of 1834, producing a series of pictures, partly historical, partly genre. Louis Philippe then commissioned him to paint galleries of the museum at Versailles with scenes relating to the conquest of Algeria, a country which he several times visited. In 1840 we find him traveling in Egypt, Palestine, and Syria; in 1842 he accompanied the Emperor Nicholas on a journey from St. Petersburg to Sebastopol; and in 1845 he visited Spain and Algeria. In 1853 he followed the French army to Varna, but soon returned to Paris and produced his last great picture, *The Battle of the Alma*.

Vernier (ver'ni-er), an index fitted to slide along the edge of a scale (as that of a barometer) and having divisions marked upon it, by means of which readings may be taken to small fractions of the parts actually marked on the scale. Suppose we have a scale of inches and tenths of an inch, and suppose the index is $\frac{9}{10}$ths of an inch, and divided into 10 divisions. Suppose that in taking a reading the end of the index is past the 8 figure on the scale we write down 8, that it is past 3 of the tenth spaces and part of another we add .3, then looking up the index we find that its 6th division most nearly coincides with a division on the scale and we add .06, and so the position of the index is taken as marking 8.36 inches.

Vernon, a town (township) in Tolland Co., Connecticut, which contains the city of Rockville and the village of Vernon, in which woolens, warps, and yarns are manufactured. Pop. 9087.

Verona (vē-rō'nȧ), a city of Northern Italy, capital of the province of same name, beautifully situated on both sides of the Adige. The town is surrounded by battlemented walls, and is entered by five beautiful gates. The streets are narrow and crooked, but there are several elegant squares. Verona has a Roman amphitheater, supposed to have been built about the second or third century of our era, the interior of which is nearly perfect; an imposing cathedral in the Gothic style dating from the fourteenth century, and many other magnificent churches rich in paintings and other art treasures. Other notable edifices are the Palazzo del Consiglio, adorned with statues of celebrated natives of the town; and the Gothic tombs of the Della Scala family (Scaligeri), who ruled Verona from 1262 to 1389. Modern public buildings include theaters, a museum, a library, hospitals, literary institutions, etc. The town has manufactures of silks, woolens, hats, etc., and a considerable trade. Verona was subject to the Romans in the second century B.C., and on the decline of the Roman Empire it was taken by the Goths, and became the capital of Theodoric's empire. In 774 it was captured by Charlemagne, and subsequently became an independent republic. Weary of the continual dissensions of its nobles, it voluntarily ceded itself to Venice, under which it remained from 1405 to 1797. It subsequently belonged to the Austrians, and in 1866 became a city of the new Kingdom of Italy. Pop. (1914) 84,755.

Veronese (vā-ro-nā'ze), PAUL, the popular name of Paolo Cagliari, an eminent Italian artist, born

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at Verona in 1528. He studied painting under his uncle, Antonio Badile, and worked successively in Venice, Rome, and other cities of Italy, but Venice was his chief residence. He was an excellent colorist, and was distinguished by the richness and fertility of his imagination. He was a contemporary of Titian and Tintoretto. He died at at Venice April 19, 1588. His pictures are exceedingly numerous and varied in subject. Among his masterpieces are: *The Marriage at Cana* (now in the Louvre), *The Calling of St. Andrew to the Apostleship, The Rape of Europa, The Family of Darius at the Feet of Alexander, Adoration of the Magi, Consecration of St. Nicholas and St. Helena,* and *The Vision of the Invention of the Cross.* The last five mentioned are in the British National Gallery.

Veronica (ve-ron'i-ka). See *Speedwell.*

Veronica, SAINT, a female saint who, according to legend, met out Saviour bending under the weight of the cross, and offered him her veil to wipe the sweat from his brow, when the divine features were found miraculously impressed on the cloth. This veil was brought from Palestine to Rome, where it is still preserved by the canons of St. Peter's.

Verrazzano (ver-rat-sa'nō), or VERRAZANI, GIOVANNI DE, an Italian navigator, born about 1486. He is believed to have visited the coast of North America in the service of France in 1508 or earlier. In 1524 he is said to have traced the coast from Cape Fear to New England, probably entering the Hudson River and Newport. This visit has been doubted by some writers and does not seem well authenticated. He finally became a privateer or pirate, and was taken and executed at Pico, Spain, in 1527.

Versailles (ver-sālz'; French pron. ver-sâ-yé), a town of France, capital of the department of Seine-et-Oise, in a plain, 11 miles s. w. of Paris. It is regarded as one of the handsomest towns in Europe, having been built under the auspices of the sovereigns of France, particularly Louis XIV, who made it the seat of his court and erected the palace. The latter is a large and imposing building with an extensive park and gardens, fine fountains, etc. Louis Philippe converted the palace into a national museum, and it contains an immense collection of statues and paintings representing personages and events connected with the French monarchy from Clovis downwards. In October, 1870, the Germans established their headquarters at Versailles; and from March, 1871, till 1879 it was the seat of the French government. Pop. (1911) 60,458.

Verse, a measured and cadenced form of speech or composition, usually adopted in poetry. It seems to be the natural language of passion, yet it has unquestionably been improved and developed by art. The use of rhymed cadences is a comparatively modern invention. (See *Rhyme.*) Grammarians have elaborately classified the varieties of verse, and analytically distinguished the possible divisions of words into bars of accented and unaccented syllables. (See *Rhythm.*) The term is also applied to a line of poetry consisting of a certain number of metrical feet disposed according to the rules of the species of poetry which the author intends to compose. Verses are of various kinds, as hexameter, pentameter, etc. ***Blank verse*** is verse in which the lines do not end in rhymes. (See *Blank Verse.*) ***Heroic verse*** is rhymed verse in which the lines usually consist of ten syllables, or in English of five accented syllables, constituting five metrical feet.

Versecz (ver'shets), a town of Hungary, county of Temesvar. It is the see of a Greek bishop, and has silk mills, and a large trade in silk and wine. Pop. 22,199.

Verst, a Russian measure of length, equal to 3500 English feet, or very nearly two-thirds of a mile.

Ver'tebra. See *Spine.*

Vertebrata (ver-te-brā'ta), the name given to the highest subkingdom of animals, consisting of those animals which in early life usually possess a backbone, but which invariably possess a ***notochord*** (which see); which have never more than four limbs disposed in pairs; which possess jaws as parts of the head; and which have the great nerve-centers contained within a special case formed by the skull and spinal column. In all Vertebrata save the lancelet a distinct heart is developed. The Vertebrata include the classes Pisces (fishes), Amphibia (frogs, etc.), Reptilia (reptiles), Aves (birds), and Mammalia (quadrupeds and man). They have also been classified into Ichthyopsida, including Pisces and Amphibia; Sauropsida, comprising Reptilia and Aves; and Mammalia. See these headings.

Vertigo (ver'ti-gō), an attack of giddiness or swimming of the head in which objects appear to move in various directions though stationary, and

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the person affected finds it difficult to maintain an erect posture. It is a common symptom of an irregular (excessive or defective) supply of blood to the brain and of nervous and general debility; but it frequently arises from some disturbance of the digestive organs.

Vertue (ver'tū), GEORGE, a distinguished engraver, born in Westminster in 1684. He enjoyed the patronage of Sir Godfrey Kneller, and became engraver to the Society of Antiquaries in 1717. He died in 1756. His best-known works include twelve *Portraits of Poets* and ten *Portraits of Charles I and His Friends.*

Vertumnus (ver-tum'nus), a Roman deity who presided over crops and orchards. He is generally represented as a young man crowned with flowers, and holding in his right hand fruit, and a horn of plenty in his left. He was the husband of Pomona.

Ver'ulam, LORD. See *Bacon.*

Vervain. See *Verbena.*

Verviers (ver-vi-ā), a town of Belgium, province of Liege, on the Vesdre, 14 miles E. S. E. of Liege. It is celebrated for its manufacture of broadcloth, which is the staple of the town. There are also cotton, leather, and other manufactures. Pop. 49,168.

Vesalius (ve-sā'li-us), ANDREAS, the father of modern anatomy, born at Brussels in 1514; died at Zante in 1564. He was physician to the Emperor Charles V and to Philip II. His chief work, *De Corporis Humani Fabrica,* opened a new era in the science of medicine.

Vesoul (vē-sōl), a town of France, capital of the department of Haute-Saône, on the Durgeon, 27 miles N. of Besançon. It is surrounded by vineyards, and is well built. Pop. 8702.

Vespa. See *Wasp.*

Vespasian (ves-pā'zhi-an; Lat. VESPASIANUS), TITUS FLAVIUS, Emperor of Rome, was born near Reate, in the country of the Sabines, in A.D. 9. After serving with distinction in Germany and in Britain as commander of a legion, he was made consul. He afterwards became proconsul of Africa, and on the rebellion of the Jews he was sent with an army into Judæa (A.D. 66). He reduced nearly all Galilee, and was preparing to attack Jerusalem when he received news of Nero's death (A. D. 68). Then followed the emperors Galba, Otho and Vitellius, and in A.D. 69 Vespasian was himself elected emperor by the army, and arrived in Rome about the middle of the year 70, leaving the siege of Jerusalem to his son Titus. He immediately reformed the discipline of the army, purified the senatorial and equestrian orders, and improved the administration of justice. He favored arts, letters, and learned men, particularly Quintilian, Pliny and Josephus. He rebuilt a part of the city, restored the capitol, and erected the gigantic amphitheater, the ruins of which are still celebrated under the name of the *Coliseum.* Vespasian died A.D. 79.

Coin of Vespasian.

Vespucci Amerigo (ves-pōt'chē a-mā-rē'gō), or AMERICUS VESPUCIUS, an Italian navigator, after whom the continent of America is named; born in Florence in 1451. He took part in a voyage to America in 1499, by which part of the mainland of South America was explored. In 1501 he was sent by Portugal on an exploring voyage to Brazil. He appears to have made four voyages to the New World, probably serving as astronomer. Without any initiative on his part, his name was applied by a mapmaker to the lands visited by him, and in time came to designate the whole continent. He died in 1512.

Vesta (ves'ta), a Roman divinity, the goddess of the hearth. She was worshiped, along with the Penates, at every family meal, when the household assembled round the hearth, which was in the center of the room. Her public sanctuary was in the Forum, and the sacred fire was kept constantly burning in it by the vestals, her priestesses. The vestals are said to have been established by Numa. There were at first four, and afterwards six of them. They were taken from six to ten years of age. They were bound to virginity for thirty years, the term of their service, after which they were allowed to marry. Their per-

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sons were inviolable, and they were treated with great honor, and had important public privileges. The punishment of a vestal who was guilty of unchastity was burying alive.

Vesta, in astronomy. See *Asteroids.*

Vestals. See *Vesta.*

Vestments (vest'ments), SACRED, the official garments worn by ministers of religion. The term is also applied to the altar cloths. Among Catholics and High Churchmen, who believe that Christianity has retained a special priesthood and ritual, much importance is attached to vestments. See *Ritualism,* also *Chasuble, Stole,* etc.

Vestry (ves'tri), a room adjoining a church where the vestments of the clergy are kept. Hence the place of meeting of those having the charge of parochial affairs, and collectively the persons themselves to whom these affairs are intrusted. In England the minister, church-wardens, and chief men of a parish generally constitute a vestry, and the minister, whether rector, vicar, or perpetual curate, is ex-officio chairman. The powers of the vestry include the expenditure of the parish funds, the repairing or alteration of churches or chapels, and the appointment of certain parish officers. In London the vestries are highly important bodies. In the Episcopal Church in the United States the vestry is a committee chosen annually by the parish, which, in conjunction with the church wardens, manages its temporal concerns.

Vesuvius (ve-sū'vi-us), a volcanic mountain of Southern Italy, 10 miles E. S. E. of Naples. It rises in the center of a plain 2300 feet above the sea, in a pyramidal cone of about 1900 feet; total height, over 4200 feet, liable to alteration at eruptions. The cone is truncated, and about 2000 feet in diameter. Previous to an eruption about 1838 the top was an uneven plane, but was then converted into a hollow cup sloping to a depth of 500 feet. A precipitous rocky ridge, 1400 feet high, called Monte Somma, lies to the north of the cone, from which it is separated by a deep valley called the Atrio del Cavallo. At the western extremity of this valley an observatory has been established. The lower belt of the sloping plain is about 2 miles broad; it is laid out in vineyards and well cultivated. Above this belt the plain is rugged and covered with scoriæ. Monte Somma is supposed to have formerly formed a complete cone of larger dimensions than the present one, being subsequently altered by volcanic forces in the same manner as 800 feet of the present cone was carried away by an eruption of 1822. The first recorded symptoms of activity exhibited by Vesuvius occurred in A.D. 63. In 79 a great eruption buried in ashes the Roman cities of Herculaneum and Pompeii. The next recorded discharge of ashes and lava was in 1036. Since then there have been many violent eruptions, the most noted of which was that of 1631, when it is estimated that 18,000 lives were lost. Many other severe eruptions have since taken place, a very violent one in 1872, and several within the present century. A wire-rope railway, traversed by one carriage going up while another is coming down, was opened in 1880, and carries visitors to within a short distance of the crater.

Vestibule Trains, trains of railroad cars provided with inclosed and connected platforms. The expedient of inclosing, or as it has been termed, the vestibuling of, car platforms for the comfort and convenience of passengers having occasion to pass from car to car while a train is in motion adds considerably to their safety.

Veszprim (ves'prim), a town of Western Hungary, north of Lake Balaton, with a fine cathedral. Pop. 14,144.

Vetch, the popular name applied to plants of the genus *Vicia,* more especially to *V. sativa,* the common vetch or tare. The name is also applied, with various epithets, to many other leguminous plants of different genera; as, the *horseshoe vetch,* of the genus *Hippocrēpis;* the *milk-vetch,* of the genus *Astragălus,* etc. See *Tare, Vicia.*

Veterinary Art (vet-er-e-nā'ri), the art which deals with the nature, causes, and treatment of the disorders of domestic animals. The first veterinary school was instituted in 1762 at Lyons; in 1766 that at Alfort near Paris was opened. A similar institution was established at London in 1791, and in the year following one in Berlin. In Edinburgh instruction in veterinary medicine began to be given by Mr. Dick in 1819, and in veterinary surgery in 1823. In the United States veterinary chairs have been added to some of the universities, but most of the schools are private institutions.

Veto (vē'tō; Latin, 'I forbid'), the power which one branch of the legislature of a country has to negative the resolutions of another branch, or the right of the executive branch of govern-

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ment, such as king, president, or governor, to reject the bills, measures, or resolutions proposed by the legislature. In Britain the power of the crown is confined to a veto, a right of rejecting and not resolving, and even this right is rarely exercised, the last occasion being in 1707. In the United States the president may veto all measures passed by Congress, but after that right has been exercised the rejected bill may become law by being passed by two-thirds of each of the houses of Congress.

Vevey (ve-vā'), a town of Switzerland, canton Vaud, beautifully situated at the N. E. margin of Lake Geneva, 11 miles E. S. E. of Lausanne, a favorite place for visitors and foreign residents. Pop. 11,781.

Viaduct (vī'a-dukt). See *Bridge* and *Railways*.

Vianna (vē-ăn'â), a seaport of Portugal, province of Minho, at the mouth of the Lima, 40 miles N. of Oporto. Pop. 10,000.

Viareggio (vi-â-red'jō), a seaport of Central Italy, province of Lucca, on the Mediterranean, a favorite watering place. Pop. 14,863.

Viaticum (vī-at'i-kum), literally provision for a journey; in the Roman Catholic Church, the eucharist administered to patients who are so ill as to be deemed beyond hope of recovery.

Viatka (vyât'kâ), VYATKA, a town of Russia, capital of the government of same name, on the Viatka, 500 miles E. N. E. of Moscow. It has a cathedral, some manufactures, and a large trade. Pop. 15,776.—The government has an area of 59,172 square miles, and a pop. of 3,082,788. The surface is much broken by low hills, and large tracts are under wood and natural pasture. The soil yields good crops of corn, flax and hemp. The drainage belongs to the basin of the Volga.

Viborg (vē'borg), a town of Denmark, on the lake of Viborg, 36 miles N. W. of Aarhus. It is a bishop's see, and has a good cathedral; and manufactures of linen, tobacco, etc. Pop. 8623.

Vi'borg, or WIBORG, a seaport of Finland, capital of a government of the same name, on a deep inlet of the Gulf of Finland, 74 miles N. W. of St. Petersburg. It has an active export trade. Pop. estimated 31,000.

Vibrio (vī'bri-ō), a name of certain infusoria or microscopic organisms, sometimes called *microscopic eels*, and now often regarded as bacteria, or of fungoid nature.

Viburnum (vi-bur'num), a genus of plants, nat. order Caprifoliaceæ, including the gelder-rose and laurustine (which see), and *V. Lantăna*, the wayfaring tree, native of N. America, Europe and Asia. The young shoots are used in Germany for basket-making; the wood is sometimes employed in turning and cabinet making; the berries are used for making ink, and the bark of the root for making bird-lime.

Vicar (vik'ăr), in a general sense, a representative or vicegerent. The pope calls himself *vicar of Christ on earth*. In the Church of England a vicar is the priest of a parish who receives only the smaller tithes or a salary. *A vicar apostolic*, in the Roman Catholic Church, is a bishop who possesses no diocese, but who exercises jurisdiction over a certain district by direct authority of the pope; *vicar general*, the official assistant of a bishop or archbishop.

Vice-admiral. See *Admiral*.

Vice-chancellor. See *Chancellor*.

Vice-consul. See *Consul*.

Vicenza (vi-chen'tsâ), a town of North Italy, capital of a province of the same name, 49 miles west of Venice, beautifully situated on the Bacchiglione, where joined by the Retrone at the foot of some wooded hills. It is well built, containing handsome streets and several elegant squares. The public buildings are almost all the work of Palladio, who was born here, or of scholars who rather slavishly imitated him. The most remarkable edifices are the Duomo or cathedral; the Palazzo della Ragione (town-hall), an ancient Gothic building, with fine connected buildings by Palladio; the Museum, one of Palladio's finest buildings; the Palazzo-Prefitizzio, and the theater, both by Palladio; the Academy of Sciences and Arts, founded in 1550; lyceum, churches and hospitals. Pop. (1914) 56,296.—The province has an area of 1050 sq. miles; pop. 450,000.

Viceroy (vīs'roi), the governor of a kingdom or country, who rules in the name of the monarch with regal authority as his substitute.

Vice-president, an executive official of the United States government, who ordinarily presides over the Senate, voting only in case of a tie vote in that body; but who succeeds to the office of President in case of the death or disability of the elected president. On several occasions the vice-president has succeeded to the presidency.

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He is elected with and in the same way as the president, the person receiving the highest number of electoral votes for the vice-presidency obtaining the office, if this number be a majority of the whole body of electors. If not, then the Senate is empowered to choose a Vice-President from the two receiving the most votes. In this case a majority vote in the Senate, if a quorum of two-thirds is present, will suffice for the election.

Vichy (vē-shē), a town of France, in the department of the Allier, in a valley of the river of that name, 32 miles S. S. E. of Moulins. It was once a place of strength, and is celebrated for its thermal alkaline springs. The Vichy waters are in much request for disorders of the stomach and bowels, and of the urinary organs, in gout, rheumatism, etc. Much of the water is sent out in bottles. Pop. (1906) 14,520.

Vicia (vis'i-a), the vetch genus of plants, which, besides the vetches, includes also the *V. Faba* or common field bean. See *Vetch*.

Vicksburg (viks'burg), a city of Mississippi, county seat of Warren Co., situated on the Mississippi and Yazoo Rivers, 400 miles above New Orleans. It is a port of entry and the most important commercial city of the State. Vicksburg has an extensive trade in cotton and is the business center of a large district. Its industries embrace railroad car works, iron foundries, oil mills, saw-mills, wagon, broom, mattress, furniture and ice factories, etc. During the Civil War this place was strongly fortified by the Confederates. After a long siege it was surrendered to Grant, July 4, 1863. Pop. 20,814.

Vico (vē'kō), GIOVANNI BATTISTA, a jurist, critic, and historian, was born at Naples in 1668, was educated by the Jesuits, and studied law. In 1697 he was appointed professor of rhetoric at the University of Naples, and in 1735 historiographer-royal. His *Principi d'una Scienza Nuova d'intorno alla Commune Natura delle Nazioni* (1725) has caused him to be regarded as one of the founders of the philosophy of history. He also wrote *De antiquissima Italorum Sapientia* and other works. Vico died at Naples, January 20, 1744.

Victor Amadeus II, Duke of Savoy, and first king of Sardinia, was born in 1666; died in 1732. He joined the Austrians in the war of the Spanish Succession, and at the Peace of Utrecht (1713) he obtained the addition of Sicily to his dominions. In 1720 he gave up that island to the Austrians in exchange for Sardinia, and then took the title of King of Sardinia. He abdicated in favor of his son, Charles Emmanuel III, in 1730.

Victor Emmanuel II (VITTORIO EMMANUELE), the eldest son of Charles Albert, king of Sardinia, was born at Turin, March 14, 1820. His aptitude for a military career became evident when he commanded the Savoy brigades against Austria (1848–49), and distinguished himself in the battle of Goito by his reckless valor. After the battle of Novara (March 23, 1849) his father abdicated, and Victor Emmanuel ascended the throne of Sardinia. He had then to negotiate with Austria under most unfavorable circumstances, but he

Victor Emmanuel.

steadily refused to give up the principle of representative government in the Sardinian constitution, and this gained for him the name of honest king (*re galantuomo*) and the good-will of the Italian people. This latter was only gained, however, after much calumny and misunderstanding, but the young king pursued from the first a policy which led to the national unity of Italy. Under the advice of his celebrated minister, Cavour, he regulated the finances, reorganized the army, and secularized the church property, for which he was excommunicated by the pope. He took part in the Crimean war, and in 1859, assisted by France, renewed the contest with Austria, taking part in the battles of Magenta (June 4) and Solferino (June 24). By the Treaty of Villafranca and the Peace of Zürich which followed these successes, Lombardy was added to his dominions, but he had to cede Savoy and Nice to France. Parma, Modena and Tuscany now became united

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to Sardinia, and Garibaldi's successes in Sicily and Naples brought the whole of Southern Italy over to Victor Emmanuel. On March 17, 1861, he assumed the title of King of Italy, and early in 1865 Florence became the royal residence. By the Peace of Vienna (1866) Austria ceded Venetia, and on the withdrawal of the French garrison from Rome in 1870 that city annexed itself to Italy, of which it was made the capital. The king entered Rome on July 2, 1871, and took up his residence in the Quirinal. He died January 9, 1878, and was succeeded by his son Humbert.

Victoria (vik-tō'ri-a), a British colony in the southeast of Australia, bounded N. by New South Wales, S. E. by the Pacific, S. by Bass Strait and the Southern Ocean, and W. by South Australia; area, 87,884 square miles. It has about 600 geographical miles of sea-coast, with considerable bays and indentations, especially about the middle, where Port Phillip Bay, with an area of 875 square miles and an entrance barely 2 miles wide, affords shelter sufficient for the largest fleet. The interior, though diversified by mountains, is chiefly distinguished by vast unwooded plains mostly occupied as pasture. There is one principal mountain range, a portion of the Great Dividing Range of Eastern Australia, running from east to west through the colony, with various off-shoots. Its highest peak is Mount Bogong, of 6500 feet elevation. It is divided into separate ranges called the Grampians and the Australian Alps, which are connected by such ranges as the Pyrenees and Hume Range, containing numerous cones and extinct craters, and composed of metamorphic rocks of granite, quartz, syenite, etc. This is the region of the goldfields. The rivers are numerous, but are generally small and dry up in summer, leaving the country parched. The chief is the Murray, which rises in the Australian Alps, forms the northern boundary of the colony for 980 miles, is in all 1300 miles long, and is navigable for several hundred miles. The climate of Victoria is temperate, but liable to sudden fluctuation; and hot winds blow at intervals from November to February, causing great discomfort. The hottest period is in January and February, when the thermometer may rise to 108° in the shade. For the chief animal and vegetable products native to the colony see *Australia*. Some of the common English quadrupeds and birds have been introduced, such as hares, rabbits, deer, pheasants, partridges, larks, etc., and are now becoming quite plentiful. Rabbits have become so numerous in some districts as to prove a serious nuisance and source of loss to the planters. Victoria is the principal gold-producing colony of Australia, the yield amounting in value to about $15,000,000 annually. The total yield since the discovery of gold in 1851 has been about $1,500,000,000. Tin, antimony, copper and coal are also among the minerals worked. Agriculture has much improved of late years, wheat and oats being the two cereals chiefly cultivated. The great staple of the colony, however, is wool, the annual wool clip yielding nearly $20,000,000. The estimated number of sheep approaches 15,000,000 and of cattle nearly 2,000,000. The vine is extensively cultivated, and the wines are becoming well known in Europe. Many kinds of fruits are grown, also tobacco, hops, etc. Victoria is divided into the four districts of Gipps Land, the Murray, Wimmera and Loddon, which are subdivided into thirty-seven counties. The government is invested in a governor appointed by the crown, aided by an executive ministry consisting of twelve members, and a parliament consisting of a legislative council of forty-eight members elected for fourteen provinces, and a legislative assembly of ninety-five members for eighty-four districts. On January 1, 1901, it became one of the states of the commonwealth of Australia. Victoria was first colonized from Tasmania in 1834. It made rapid progress, especially in sheep breeding, and the discovery of gold in 1851 caused a rush of population from all parts. Hitherto it had been known as Port Phillip, and formed part of New South Wales, but in this year (independently of the gold discovery) it was erected into a separate colony under the name of Victoria. In 1850 the population numbered 76,162; in 1854 it was 312,307. In 1856 responsible government was conferred on the colony. The chief towns are Melbourne (the capital), Geelong, Ballarat and Sandhurst. The population was estimated in 1911 as 1,350,000, including nearly 10,000 Chinese, and several hundred aborigines.

Victoria, capital of British Columbia, is situated on Vancouver Island, on the north side of the Strait of Juan de Fuca, in very beautiful scenery. The public buildings include the Parliament house, government offices, provincial museum and library, city hall, etc., while in the environs are many attractive villas, surrounded by beautiful gardens. The manufacturing interests include powder works, potteries, coaling, lumber and brewing industries,

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and large fish-canning establishments. It is also engaged in boat building. The harbor of Victoria for large vessels is at Esquimault, 3 miles distant, where there is a station of the British navy. Pop. 31,660.

Victoria. See *Hong-Kong.*

Victoria I (ALEXANDRINA), Queen of Great Britain and Ireland and Empress of India, only child of Edward, duke of Kent, and of his wife Princess Victoria Mary Louisa, was born at Kensington Palace, May 24, 1819. Her father died January 23, 1820, and she became heiress-presumptive to the crown on the accession of William IV in 1830. The latter dying without issue (June 20, 1837), she ascended the throne of Great Britain and Ireland, that of Hanover falling by the Salic law to her uncle, the Duke of Cumberland. She was crowned in Westminster Abbey, June 28, 1838, and on Feb. 10, 1840, married her cousin, Prince Albert of Saxe-Coburg-Gotha, who died December 14, 1861. In 1876 she assumed the title

Queen Victoria.

of Empress of India. Her children were nine in number, of whom the eldest, Victoria, became empress of Germany, and the second, Albert Edward, succeeded her on the throne, as Edward VII. A striking feature of the Victorian era was the rapid development and extension of the British colonies. Of the warlike events of her reign the most important were those of the Crimea and South Africa and the rebellion in India. Her period was so marked by literary progress and political and industrial development that it is spoken of appreciatively as the Victorian era, as a counterpart of the Elizabethan era. She died Jan. 22, 1901.

Victoria Cross, a British military decoration instituted at the close of the Crimean war in 1856. It is granted to soldiers and sailors of any rank for a single act of valor in presence of the enemy. It was instituted in imitation of the French cross of the Legion of Honor. It is a Maltese cross, with a royal crown in the center, surmounted by a lion, and the words 'For Valour' indented on a scroll below the crown. The ribbon is red for the army, and blue for the navy. A pension of £10 a year accompanies the decoration. Since the foundation upwards of 400 officers and men have been recipients of this honor.

Victoria Cross.

Victoria Falls, a cataract of the Zambesi (which see), in lat. 17° 55′ S., lon. 26° 32′ E. The river here, nearly a mile broad, drops 330 feet into a narrow transverse fissure or crack crossing its course, the water then passing away in a narrow rocky gorge. They vie with Niagara Falls in grandeur and surpass them in height. These falls were discovered by Livingstone in 1855. The gorge above the falls is now crossed by a single-span railway bridge, the most elevated structure of its kind in the world, the rails standing 420 feet above the water.

Victoria Harbor. See *Labuan.*

Victoria Land, South Victoria, the name given that portion of the supposed Antarctic continent which bounds Ross Sea on the west. It is mountainous in character, and contains the two volcanoes Erebus and Terror. Southward it extends from Cape Adare to a lofty plateau of wide extent.

Victoria Nyanza, a lake of East Africa, about 400 miles inland from the Indian Ocean, crossed near its north end by the equator, about 3800 feet above the sea; area, about

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26,000 square miles, or nearly as large as Scotland. It communicates with the Albert Nyanza by means of the Victoria Nile, and is the principal feeder of the Nile. It contains many islands, some of them of considerable size. The Ripon Falls, about 1200 feet across, mark the discharge of the Nile from the lake. It was discovered by Captain Speke in 1858. The area of the lake is almost equally divided between British and German East Africa. Its most important tributary is the Kagera, now looked upon as the head-stream of the Nile.

Victoria Regia, the name given to a magnificent water lily, first found in the river Berbice, in British Guiana, in 1837, by Sir Robert Schomburgk. It belongs to the nat. order of Nymphæaceæ, and was dedicated by the discoverer to Queen Victoria. The leaves measure 5 or 6 feet across; they are of a bright green above and a deep violet on the lower surface, with a uniformly turned-up margin about 3 inches high. The flowers are more than 1 foot in diameter, are of all shades from white to pink, and exhale an agreeable odor. The plant is successfully cultivated in the United States.

Vicuna (vi-kun'yâ), a ruminant animal (*Auchenia vicugna*), closely allied to the llama. It is a native of South America, frequenting the lofty slopes of the Andes of Chile, etc., near the region of perpetual snow, and somewhat resembles the chamois in its habits. See *Llama*.

Vidocq (vē-dok), EUGENE FRANÇOIS, a famous French detective, born at Arras in 1771. He began his career as a thief, and was successively soldier, deserter, gambler, and vagabond, being often imprisoned for his offenses. He entered the police service as a detective in 1810, his success in this vocation being so great as to give him a wide reputation. He died in 1850, leaving a history of his exploits, which is not considered truthful.

Vienna (vē-en'nâ; German, *Wien*), capital of the Austro-Hungarian Empire, is situated in a plain on the right bank of the Danube, and is intersected by a narrow arm of the river into which fall the Wien and other small streams. The city proper is surrounded with a rampart and ditch, called the Lines, and consists of the Innere Stadt, or old town, and the municipal districts of Leopoldstadt, the chief commercial district; Landstrasse, the official district; Mariahilf, Neubau, and Margarethen, manufacturing districts; Alsergrund, containing large general and military hospitals; and the residential districts of Wieden, Josefstadt, and Favoriten, besides extensive suburbs. The old town is still the court and fashionable quarter of the city, and is encircled by the Ringstrasse, a handsome boulevard, 55 yards wide. Vienna is on the whole a handsome, well-built town, with fine squares and straight and spacious streets. The Prater, a public park on the bank of the Danube, is about 4 miles long and 2 broad, and is considered the finest public park in Europe. Of the churches the most remarkable is the Domkirche, or cathedral, of St. Stephen, a cruciform

Street in Vienna.

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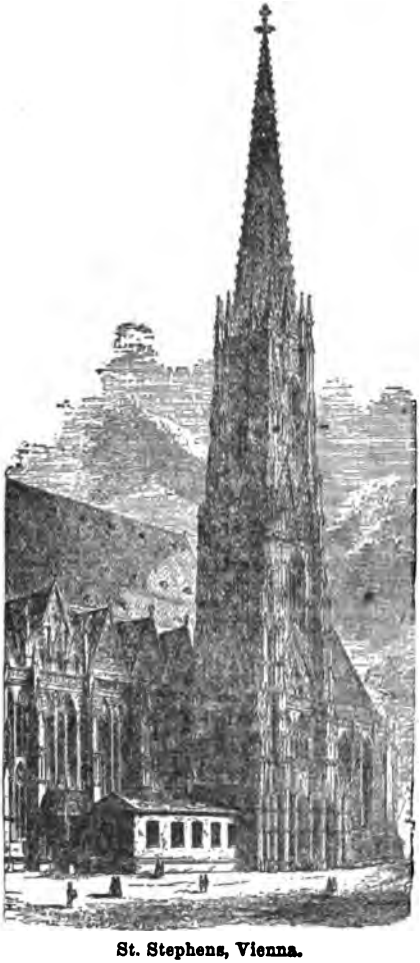
Gothic structure, with a main tower 453 feet high. The interior is adorned with numerous statues and monuments, and the tower contains a bell of 18 tons weight. The Capuchin church contains the imperial burying vaults; the Votivkirche (1856–79) is one of the finest



St. Stephens, Vienna.

specimens of modern Gothic. The imperial palace (Kaiserliche Burg) is a poor though ancient structure; the imperial summer residence, Schönbrunn, is about 2 miles from the city. The modern palaces of the archdukes and others of the nobility are, many of them, handsome buildings. Deserving of special mention are the houses of parliament, the magnificent Gothic town-house (1872–83), the courts of justice, the museums of art and of natural history, and the exchange. The university was founded in 1237, and reorganized by Maria Theresa. It has some 350 teachers, 6000 students, and a library of 340,000 vols. Other notable public buildings are the Josephinum (an academy for army surgeons), the Polytechnic Institute, and the Seminarium, a Roman Catholic institute for the training of priests. There are also Hungarian and Protestant theological institutes, an academy of fine arts, a conservatoire of music, several public libraries and museums, and a number of gymnasia and schools. The imperial library contains 900,000 volumes and 25,000 MSS. The imperial museum of natural history is one of the finest in Europe. The Treasury, among other imperial treasures, contains the regalia of Charlemagne. There are many hospitals and other benevolent institutions, and the scientific and literary associations are too numerous to mention. The principal theaters are the Hofburg and the Stadt theaters, and the fine Opera house. Vienna is the first manufacturing town in the empire, and its manufactures include cotton and silk goods, leather, porcelain, arms, hardware, and many other articles. There is also a large inland trade. Vienna appears to have been a Roman station in the first century. It was afterwards included in Upper Pannonia, and called Vindobona. After being taken by Attila, about 450, and by Charlemagne, about 791, it became the capital of the margraviate of Austria in 1142, a free imperial city in 1237; it was besieged by Sultan Solyman in 1529, and by Kara Mustapha in 1683, was occupied by Napoleon, November 13, 1805, and May 12, 1809; the old walls were demolished in 1860. It is now the center of a great railway system, and the regulation and deepening of the Danube is expected to make it the center of the shipping trade between eastern and western Europe. Pop. (1911) 2,004,291.

Vienna, Congress of. This congress was assembled on November 1, 1814, to reorganize the political system of Europe after the first overthrow of Napoleon. The principal powers represented in it were Austria, Russia, Prussia, England, and France. Spain, Portugal, Sweden, and other minor powers were also consulted on matters more nearly concerning them. The

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leading territorial adjustments effected by the congress were the following:—Austria recovered Lombardy and Venetia, while Tuscany and Modena were conferred on collateral branches of the imperial house. The King of Sardinia recovered Piedmont and Savoy, with the addition of Genoa. Murat retained Naples, but the Bourbons were soon reinstated. Holland and Belgium were erected into a kingdom for William I, Prince of Orange. Hanover, with the title of king, was returned to the King of England, and Great Britain retained Malta, Heligoland, and several conquered colonies. A federative constitution, with a diet at Frankfort, was established for Germany. Prussia received the duchy of Posen, the Rhine province, and a part of Saxony. Russia received the greater part of the grand-duchy at Warsaw, Cracow becoming a free state, protected by Russia, Austria, and Prussia. Sweden retained Norway, and Denmark was indemnified with Lauenburg. The congress was suddenly broken up by Napoleon's escape from Elba (February, 1815); but its acts were signed by the powers interested on June 9, 1815.

Vienne (vē-enn), a western department of France; area 2711 square miles. The surface is generally flat; it is well watered by the Vienne and the Creuse. Three-fifths of the surface is arable, and all kinds of cereals, maize, hemp, and indifferent wines are produced. Iron is abundant, and there are excellent quarries of marble, granite, millstones, whetstones, lithographic stones, and limestone. The manufactures consist of woolens, lace, cutlery, paper, pig-iron, etc. The capital is Poitiers. Pop. 336,343.— HAUTE-VIENNE (ōt-vē-enn; 'Upper Vienne') is a hilly department adjoining Vienne on the southeast; area, 2130 sq. miles. Almost the whole department belongs to the basin of the Loire, and it is crossed by the upper course of the Vienne. The principal crops are buckwheat, rye, beans and peas; and horses, mules and swine of a superior breed are reared. Minerals include iron, copper, tin, lead, coal, antimony and kaolin. Porcelain, woolen and other tissues, paper and leather are the chief manufactures. Limoges is the capital. The Limoges chinaware ranks with the finest made. Pop. (1906) 333,621.

Vienne, a town of France, department of Isère, on the Rhone, 49 miles N. N. W. of Grenoble. It is an ancient place, with narrow dark streets. It has a cathedral, a museum, public library, college, etc. Vienne contains numerous Roman remains, and figures prominently in ecclesiastical history, and was the capital of the Burgundian kingdom. Pop. 24,619.

Viersen (fēr'zĕn), a town of Rhenish Prussia, district of Düsseldorf, 18 miles W. of town of that name, and 10 miles S. W. of Crefeld. It has important manufactures of satin, plush, silk, woolen, linen, and cotton fabrics; leather, tobacco, etc. Pop. 27,577.

Vierwaldstättersee. See *Lucerne, Lake of.*

Vierzon (vyăr-zōn), a French town, department of Cher, 124 miles S. of Paris. It has manufactures of machinery, porcelain, glass, etc., and a technical school. Pop. 11,812.

Vigevano (vi-jā'vâ-nō), a town of Italy, province of Pavia, on the Mora, 15 miles S. S. E. of Novara. It is a bishop's see, and has manufactures of silks, hats, soap and macaroni. Pop. 18,043.

Vigfússon (vig'fŏs-sun), GUDBRAND, a Scandinavian scholar, born in Iceland in 1827; died at Oxford in 1889. He was educated first at the high school of Reikiavik, afterwards at Copenhagen University. He lived in Copenhagen from 1849 till 1864, having devoted himself to the study of old Icelandic literature. His first work, *Timatal*, on the chronology of the *Sagas*, was published in 1855, and revealed the hand of a master. In 1858 he brought out the *Biskupa Sögur*, or 'Lives of the Icelandic Bishops,' and in 1864 the *Eyrbyggja Saga*. In the latter year he came to England to undertake the Icelandic-English Lexicon, begun by Cleasby, and in 1866 began at Oxford this work, which kept him engaged for seven years, the result being the excellent dictionary issued from the Clarendon Press. In 1878 the Clarendon Press published his *Sturlunga Saga*, to which he prefixed *Prolegomena*, containing a complete history of the classic literature of Iceland. This was followed by several minor works and essays, by the *Orkneyinga Saga* and *Hakonar Saga*, and by the *Corpus Poeticum Boreale* (in conjunction with F. York Powell), a complete collection of the ancient Icelandic poetry, with translation. At the time of his death he was engaged upon a work entitled *Origines Islandiæ*.

Vigil (vij'il; Latin, *vigil*, watchful), an ecclesiastical term applied at first to the evening, and afterwards to the whole day, preceding a great festival. This name originated from the circumstance that the early Christians spent a part of the night preceding such festivals

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in prayers, to prepare themselves for the coming celebration.

Vigilance Committee, an organization of citizens formed at times in parts of the United States for the purpose of punishing and discouraging crimes with which the authorities had failed to deal with sufficient vigor. An example of this is the uprising of such a committee in early San Francisco to deal with criminals who defied the law. Lynch law is summary justice (or injustice) applied by such committees. Though usually arising under stress of great provocation, such organizations are apt to develop into an evil, which in its turn needs suppression.

Vigny (vēn-yē'), ALFRED VICTOR, COUNT DE, a French poet and novelist, born in 1799, entered the royal guard in 1816, but retired from military service in 1828, and devoted himself exclusively to literature. He died in Paris in 1863. His *Poèmes* (1822) and his allegory of *Eloa, ou la Sœur des Anges*, placed him among the leaders of the new romantic school of poets. In 1826 he published *Poèmes Antiques et Modernes*, and also an historical novel, *Cinq-Mars*, which attracted much attention. In 1835 appeared his celebrated drama *Chatterton*. He also wrote *Stello* (1832); *Servitude et Grandeur Militaires* (1835); and *Les Destinées*, a philosophical poem published after his death in 1864.

Vigo (vē'gō), a city and seaport of Northwestern Spain, province of Pontevedra, on a spacious bay. It is surrounded by walls with bastions, and

has steep, narrow, and tortuous streets. The fishing of sardines and tunnies is important, and there is an active foreign trade. Pop. 23,259.

Viking (vīk'ing; from the Icelandic *vik*, a bay or fiord, and the termination *ing*, implying one who belongs to or is descended from: literally one who lurked in bays and issued thence to plunder), a rover or sea-robber belonging to one of the bands of Northmen who scoured the European seas during the eighth, ninth, and tenth centuries. This word has been frequently confounded with *sea-king*, a term which is applied to a man of royal race, who took by right the title of king when he assumed the command of men, although only of a ship's crew; whereas the former term is applicable to any member of the rover bands. See *Northmen*.

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Vilas, WILLIAM F., statesman, born at Chelsea, Massachusetts, in 1840; died Aug. 27, 1908. He became a colonel in the Civil war, was afterwards prominent in the Democratic party, and was postmaster general 1885–89, and secretary of the interior in 1889. He was United States senator 1891–97.

Vilayet (vil-a-yet'), a name officially applied since 1865 to the large administrative districts of Turkey.

Villa-alta (vil'yä-äl'tä), a town of Mexico, state of Oajaca, in a fruitful region producing coffee, tobacco, etc. Pop. 5000.

Villach (vil'äh), an old and picturesquely situated town of Austria, on the Drave, with warm sulphur baths in the neighborhood. It has important industries. Pop. 9690.

Villafranca (vēl'lä-frän'kä), a town of Italy, province of Verona, on the Tartaro. It is celebrated as having been the center of the wars of 1848 and 1866. The preliminaries of peace between Napoleon III and the Emperor of Austria were signed here, July 11, 1859. Pop. 5037.

Village Communities, a kind of political and industrial organization claimed to have widely prevailed in early times, and which has left its traces to the present time. Those organizations seem to have been common among the tribes of the Aryan family of mankind, and they still exist in the villages of Russia and India, while evidences of their former existence are found in other localities. A clan of settlers took a tract of land, built their huts, and laid out fields which they cultivated in common as one great family. Every few years the land surrounding the village was divided into family lots, while beyond these lots was a larger area used in common for pasturage or other purposes. The Russian *Mir*, or village, is a significant example of this interesting phase of civilization. The government is in the hands of an elected council of village elders and a headman acting as chief of the council.

Villajoyosa (vil-yä-hō-yō'sä), a seaport of Spain, province Alicante, in the Mediterranean. Pop. 8902.

Villarreal (vēl-yär-rä-äl'), a town of Spain, province Castillon, 4 miles from the Mediterranean, in an orange growing district. It is surrounded by old walls. Pop. 16,068.

Villars (vil-är), CLAUDE LOUIS HECTOR, DUC DE, one of the greatest generals of the age of Louis XIV, was the son of the Marquis de Villars, and was born at Moulins in 1653. He early distinguished himself under Turenne, Condé, and Luxembourg, and was created maréchal de camp in 1690, and lieutenant-general in 1693. In the wars of the Spanish succession he was sent to coöperate with the Elector of Bavaria. He defeated Prince Louis of Baden at Friedlingen, October 14, 1702, for which he received the marshal's baton; and having joined the elector, he defeated the Prince of Baden at Höchstadt, Sept. 21, 1703. His success in dealing with the insurrection of the Camisards (see *Camisards* and *Cavalier, Jean*) obtained for him the title of duke (1705). Having been sent to defend the frontier against Marlborough, he forced the formidable lines of Stollhofen, near Strasburg, and penetrated far into Germany (1705–1707). In 1709 he replaced Vendôme in Flanders, and fought the battle of Malplaquet against Marlborough and Eugene, in which he was seriously wounded. In 1712 he defeated the allies at Denain, took Marchiennes, and relieved Landrecy. After the Peace of Utrecht he opposed Eugene with uninterrupted success, and negotiated with him the Peace of Rastadt, March 7, 1714. On the renewal of the war with Austria, in 1733, he was sent to Italy at the head of an army, with the title of Marshal-general of France. After a successful campaign, he died at Turin in 1734.

Villefranche (vēl-fränsh), a town of France, department Aveyron, at the junction of the Alzou with the Aveyron. Pop. 6297.

Villefranche-sur-Saône (-sur-sōn), a town of France, in the department of Rhone, on the Saône, 20 miles N. W. of Lyons. Pop. 14,794.

Villehardouin (vil-är-dụ-aṇ), GEOFFROY DE, a French historian, born about 1160, died about 1213. He took an important part in the fourth crusade, was present at the siege and capture of Constantinople, and when the Greek emperor was overthrown and Baldwin established in his stead, he received an extensive territory for himself in Thrace. His *Histoire de la Conquête de Constantinople*, is one of the most valuable historical works of the middle ages.

Villein (vil'en), a species of feudal serfs who were allowed to hold portions of land at the will of their lord, on condition of performing menial and non-military services. It frequently happened that lands held in villeinage descended in uninterrupted succession from father to son, until at length the

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occupiers or villeins became entitled, by prescription or custom, to hold their lands so long as they performed the required services. And although the villeins themselves acquired freedom, or their land came into the possession of freemen, the villein services were still the condition of the tenure, according to the custom of the manor. These customs were preserved and evidenced by the rolls of the several courts-baron, in which they were entered, or kept on foot by the constant immemorial usage of the several manors in which the lands lay. And as such tenants had nothing to show for their estates but the entries into those rolls, or copies of them authenticated by the steward, they at last came to be called *tenants by copy of court-roll*, and their tenure a *copyhold*.

Villeneuve (vēl-neuv), PIERRE CHARLES JEAN BAPTISTE SILVESTRE DE, a French admiral, born in 1763, entered the navy in 1777. He led the rear division at the battle of the Nile, and escaped with his own and four other ships to Malta. In 1804 he was made vice-admiral, and in 1805 Napoleon appointed him to the command of the Toulon squadron, with orders to divert the British fleet from the European coasts. He was eventually shut up in Cadiz by Nelson, but with the hope of repairing his ill success by a brilliant victory he sailed out of Cadiz, along with the Spanish fleet under Gravina, and offered the enemy battle off Cape Trafalgar (which see). Villeneuve's flagship, the *Bucentaure*, was captured, and the admiral taken as prisoner to England. In April, 1806, he was released and returned to France, but learning that his reception by the emperor would be unfavorable, he committed suicide.

Villeneuve, the name of a number of small towns in France, the most important being Villeneuve sur Lot, in Lot-et-Garonne department, which has interesting mediæval remains. It is a busy industrial and commercial place. Pop. (1906) 6978.

Villiers. See *Buckingham*.

Vilna, or WILNA (vēl'nȧ), a town of Russia, capital of the government of the same name, on the Vilia. It is picturesquely situated, and contains numerous churches and convents. It has a governor's palace, a town-house, Greek and Roman Catholic cathedrals, and numerous educational establishments. There is a considerable trade in agricultural produce sent to Baltic ports. Pop. 193,000.—The government, which lies in the Baltic, has an area of 16,406 square miles and a population of 1,591,112. The surface is generally flat, and the government produces good crops of grain, hemp, and flax. Manufactures and trade are limited. The town of Vilna dates back to the 10th century. It was the capital of Lithuania in 1320, and was united with Poland in 1447. It is reported to have had a printing press as early as 1519. Armies have devastated it many times. It was almost obliterated in the Russo-Polish wars. It was captured by the Russians in 1655 and ceded to Russia in 1656. The Swedes occupied it in 1702 and in 1706. The Russians again took possession in 1788 and it was finally annexed to Russia in 1795, after the partition of Poland. In the great European war the Teutonic forces fought their way to Vilna in 1915. The evacuation by the Russians occurred on September 19.

Vimeira (vi-mā'i-rā), a village of Portuguese Estremadura, 3 miles from Torres Vedras. It is remarkable for the battle between Wellington and Junot, fought on August 21, 1808, which was followed by the Convention of Cintra (August 30).

Vimy Ridge, BATTLE OF. The ridge thus named is the last elevation in the range of chalk hills which extend from the North Sea to Arras. It has two prolonged summits, the northern one named La Folie, from a former farm on its side; the southern one called Telegraph Hill, as the seat of an old semaphore post. It was laid open to attack as a result of the battle of the Somme (*q. v.*). As the Germans retired after the assault on the Somme this elevation offered them a post of great natural strength and they prepared to hold it at all costs, planting a strong force in the fortifications along its crest and sides. In the autumn of 1916 a force of Canadians under Sir Julian Byng was moved to this front and remained there during the winter, with desultory fighting until early April. During this period preparations for an attack on this stronghold were actively made, guns and shells in great number being brought to the lines in readiness for the spring campaign. The prelude to the battle was a bombardment of great vigor, guns thundering continuously against the height, while a fleet of aircraft moved to and fro above the trenches, directing the fire of the artillery and driving off German airplanes.

By the time fixed for the assault, at the end of the first week of April, hardly a foot of land remained on the ridge not torn by shellfire. The time fixed for the assault was the hour of 5.30 in the morning. Rain was falling heavily and the ground was a bed of mud. The distance

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to the hilltop varied from 1200 yards to a mile. As the Canadians advanced, under the protection of a barrage of shellfire, they were subjected to a fierce bombardment, chiefly of machine guns, on the extreme left. But they were not to be checked, and in a half hour they had reached and won the front line trenches in the center of La Folie ridge. Many of the Germans were ready and eager to surrender, as for a number of days their food supply had been cut off by the intense artillery fire. By nightfall the crest of Telegraph Hill had also been won, the only point still held by the Germans being Hill 145, where a strong resistance was kept up by machine guns. When the morning of April 10 broke, the rain of the preceding day had changed to snow, which swept over the ridge in a driving storm. But the daring Canadians were not to be held back, and in a short time Hill 145 was in their hands. Still another hill here confronted them, an elevation which they had given the name of 'The Pimple.' This was held by a body of the Prussian Guard, and on the morning of the 12th, the time fixed for the assault, the courageous Canadians, who had defeated a strong German counter-attack on the previous day, made a vigorous dash upon this final stronghold. A driving snow-storm was raging, the slopes of the Pimple were deep in mud, but the Canadians hurled themselves forward and won their way to the trenches, where a hand-to-hand fight went on. The assault kept up for nearly an hour, at the end of which the Pimple was won and its garrison dead or prisoners.

By nightfall the Canadian line had extended till it reached beyond the Vimy-Arras Railway, while Vimy, Petit Vimy and several other villages had been taken. In their forward movement the cavalry, which had so little to do in this struggle, played its first active part, riding far in advance of the infantry, and capturing villages and gun positions as it went. The retreat of the Germans from this fierce assault was in no sense a matter of strategy. They were driven back with such impetuosity that they had no time to remove their guns, many of them being left behind uninjured, while a large supply of ammunition was abandoned. The final act in the battle of Vimy Ridge was the dashing capture of Arleux by the Canadians. The victory, as a whole, is claimed as the most important won by the Allies to that date, and, in the words of Belloc, 'the greatest operation in the military history of England.' However this estimate be regarded, the Canadians won glory for their native land, the chief among the British colonies. What had been called 'the hinge of the Hindenburg line' was in their hands, and a door had been opened to the plains surrounding Doust. From the Vimy Ridge the British dominated Lens, the important coal regions that surround it, and the valley of the Scarpe. In this week of battle the Canadians captured 4081 prisoners, 63 guns of all calibres, 124 machine guns and 104 trench mortars, while their casualties barely equalled the number of prisoners taken.

Vincennes (vaṇ-senn), a town of France, department of the Seine, about 2 miles east of Paris. Its large old castle was once the residence of the French kings, but was converted into a State prison by Louis XI. Pop. 29,791.

Vincennes (vin-senz'), a city, county seat of Knox county, Indiana, on the Wabash River, 58 miles s. by w. of Terre Haute. The river is navigable to this point. Manufactures include flour, lumber, staves, glass, paper, tools, furniture, steel sashes and doors, steel bridge, farm implements, sewer pipe, etc. There are coal mines, oil and gas wells in the vicinity, and a shipping trade in grain and cattle. Pop. 14,895.

Vincent (vin'sent), JOHN JERVIS, EARL OF ST., a distinguished British naval commander, born at Meaford, Staffordshire, in 1734. He entered the navy at an early age, and commanded the *Foudroyant* in the action between Admiral Keppel and the French fleet in July, 1778. In 1794 he commanded a squadron in the West Indies, and reduced Martinique, Guadeloupe, and St. Lucia. On the 14th of February, 1797, in command of the Mediterranean squadron of fifteen sail, he defeated twenty-seven Spanish ships of the line off Cape St. Vincent, and was created a peer with the title of Baron Jervis and Earl of St. Vincent, and a pension of £3000 a year. In 1799 he became admiral; in 1801 first lord of the admiralty; and in 1821 admiral of the fleet. He died in 1823.

Vincent, ST., one of the British West India Islands. See *St. Vincent.*

Vincent de Paul, ST. See *Paul, St. Vincent de.*

Vinci (vin'chē), LEONARDO DA, one of the greatest Italian painters, also distinguished as a sculptor, architect, and civil and military engineer, a scientific inventor, and a man of universal genius, was the natural son of Pietro da Vinci, a Florentine notary, and was born at the village of Vinci, near Florence, in 1452. He excelled in all accomplishments, and acquired distinction

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in mathematics, physics, botany, anatomy, literature, and philosophy; but he especially excelled in the arts of design, and his father placed him in the studio of Andrea Verocchio, a celebrated painter and sculptor, who was soon surpassed by his pupil. Two of his earlier productions are still extant: The *Adoration of the Magi*, in the gallery of the Uffizi at Florence, and *The Virgin of the Rocks* in the British National Gallery. About 1482 he entered the service of Ludovico il Moro, duke of Milan, by whom he was employed in engineering as well as artistic work. His great painting of the *Lord's Supper* was finished in 1499. The original has been wholly defaced, but judging from copies and engravings, this work is universally regarded as one of the greatest ever produced. One of the

Leonardo da Vinci.

best copies is that in the Royal Academy, London, by his pupil, Marco d' Oggionno. After the occupation of Milan by Louis XII (1499) he retired to Florence, where he painted his celebrated portrait of *Mona Lisa del Giocondo*, known as *La Gioconda*, in the Louvre (from which it has recently been stolen). In 1502 he was appointed chief engineer and architect of the pope's army, and visited many of the fortified posts in the papal dominions. In 1507 he returned to Milan, and painted a *Madonna and Child* in the palace of the Melzi at Vaprio. In 1512 he painted two portraits of Duke Maximilian, son of Ludovico, and in 1516 accompanied Francis I to France. He died at Cloux, near Amboise, May 2, 1519. Leonardo executed several important engineering works at Milan, and wrote numerous treatises, few of which have been published. His *Trattato della Pittura* was printed in 1651, and contains a mass of information on the principles of art, of which all subsequent writers have availed themselves. In 1797 some fragments of Da Vinci's were published at Paris under the title of *Essai sur les Ouvrages Physico-Mathématiques de Léonard da Vinci*, etc., which created a profound sensation by their scientific insight and anticipation of modern discoveries. Da Vinci's paintings were the result of profound theoretical study of his art; he executed slowly, and was seldom satisfied with his finish of a picture, so high was his ideal. His knowledge of anatomy was deep. He made a special study of the human countenance under all circumstances. His extant works are few, and some of those attributed to him are believed to have been executed by his pupils.

Vindhya Mountains (vind'hya), a mountain range in India, stretching east to west from the basin of the Ganges to Guzerat. It forms the N. boundary of the valley of the Nerbudda, and unites the north extremities of the Eastern and Western Ghauts. It is of granitic formation, overlaid with sandstone.

Vine (vīn), a well-known climbing shrub, type of the order Vitaceæ, which consists of climbing plants with woody stems, simple or compound leaves, peduncles sometimes changed into tendrils, small green flowers, and round berries. The species are found in both the Old and New Worlds, especially in Asia. The best known and most useful of the order is the *Vitis vinifĕra*, the grapevine, cultivated in the Old World from time immemorial, of which there are numerous varieties, distinguished by possessing lobed sinuately-toothed, naked or downy leaves. It is a native of Central Asia, and its cultivation extends from near 55° north latitude to the equator, but in south latitude it only extends to about 40°. It is rarely grown at a greater altitude than 3000 feet. France is probably the greatest vine-growing country in the world, though its cultivation is active in several other countries of Europe. Several species of vine are indigenous in North America, as the *Vitis Labrusca*, the wild vine or fox-grape; *V. cordifolia* or *riparia*, heart-leaved vine, river-side vine, or frost-grape; and *V. æstivālis*, the summer grape. About 1771 a European vine was introduced on the Pacific slope, and the culture has increased to great dimensions, especially in California. In other parts of the United States, however, the native American species are chiefly cultivated, and a number of excellent varieties have been produced, both for table and wine purposes. The vine has also been intro-

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duced into Australia, where it thrives well, and quantities of wine are produced. The vine grows in every sort of soil, but that which is light and gravelly is best suited for the production of fine wines. It is a long-lived plant; indeed, in suitable climates the period of its duration is not known. It is propagated from seeds, layers, cuttings, graftings, and by inoculation, the first method being used for obtaining new varieties. Some vines produce dark-colored berries (black or red so called), others white. The Burgundy may be considered the most general vineyard grape of France, and the best wines in Italy and Spain are also made from grapes of this description. The sweet wines are made from sweet-berried grapes allowed to remain on the plants till overripe. Most varieties of the vine bear only once in the season, some oftener, especially in warm climates. In recent times the vine has been subject to a disease caused by the growth of a fungus known as *Oidium*. It appeared about 1845, and gradually spread over Southern Europe. Its ravages abated about 1863, but the vine has since been attacked by a still more destructive disease produced by an insect called the *Phylloxera* (which see). Grapes are extensively used in the dry state under the name of raisins, chiefly imported from Spain and the Levant, and now largely produced in California. The dried currants of commerce are the produce of the small seedless Corinthian grape which is cultivated in Greece and in many of the Greek Islands. The vine is mentioned in the most ancient historical records, and the grape has been in use for the making of wine for more than 4000 years. The Phœnicians introduced the vine into Europe. Vineyards are mentioned in Domesday Book as existing in England, but in the reign of Henry II the cultivation of the vine began to be neglected. For the manufacture of wines see *Wine*.

Vinegar (vin'e-gar), the name given to dilute and impure acetic acid (which see), obtained by the vinous fermentation. In wine countries it is obtained from the acetous fermentation of inferior wines, but elsewhere it is usually procured from an infusion of malt which has previously undergone the vinous fermentation. Vinegar may also be obtained from strong beer, by the fermentation of various fruits, or of a solution of sugar mixed with yeast; in short, all liquids which are capable of the vinous fermentation may be made to produce vinegar. The cider of apples, for example, is largely converted into vinegar. Vinegars yield by distillation a purer and somewhat weaker acetic acid, called *distilled vinegar*. *Wood vinegar* is an impure acetic acid obtained by the distillation of wood; called also *Pyroligneous acid*. Common and distilled vinegar are used in pharmacy for preparing many remedies, and externally in medicine, in the form of lotions. The use of vinegar as a condiment is universal.

Vinegar-eel, an animal so called from its eel-like shape, but in fact a minute thread-worm or Nematode which is found in paste, vinegar, stagnant water, and in fermenting and decaying substances. Its body is almost transparent, though with thick cuticle, and it multiplies with great rapidity.

Vinegar-plant, a peculiar state of the *Penicillium glaucum*, a fungus found on decaying substances, and in fluids in a state of acetification. It forms a flocculent mass, which is tough and crust-like or leathery. A small piece of this when immersed in a mixture of sugar or treacle and water produces a rather insipid kind of vinegar.

Vineland, a borough in Cumberland Co., New Jersey, 34 miles S. by E. of Philadelphia. Glass, boots, shoes, clothing, grape juice and wine are produced, and there is a large poultry industry. A Training School and State Home for Feeble-minded are located here. Pop. 5282.

Vinet (vi-nā), ALEXANDRE RODOLPHE, a Swiss theologian and writer, born at Lausanne in 1797; died in 1847. In 1817 he was appointed professor of the French language and literature at the Basel Gymnasium, in 1835 at the Basel University, and in 1837 accepted the chair of theology in the academy at Lausanne. In 1840 he seceded from the national church, maintaining that there should be no connection between Church and State. His views on this subject were enforced in his *Essai sur la Manifestation des Convictions religieuses, et sur la Séparation de l'Église de l'État* (1842). In 1845 he gave up his chair. He was an earnest and eloquent preacher, and wrote *Histoire de la Littérature Française, au XVIIIe Siècle; Études sur la Littérature Française du XIXe Siècle*, etc.

Vinland (vin'land), the name given to the settlement made by the early Norsemen on the North American coast, probably that of New England, though its location is questioned, about 1000 A.D. So called from the vines they found growing, the name signifying 'Wineland.' The settlement existed for about ten years.

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Viol (vī'ul), a class of ancient musical instruments which may be regarded as the precursors of the modern violins. They were fretted instruments with three to six strings, and were played on with a bow. There were three instruments differing in pitch in a set, the treble, tenor, and bass viols, and in concerts they were commonly played in pairs: two treble, two tenor, and two bass. The bass viol, or *viol de gamba*, was the last to fall into disuse, which it did about the close of the eighteenth century.

Viola. See *Violin* and *Violet.*

Violaceæ. See *Violet.*

Violet (vī'u-let; *Viŏla*), the popular name given to the species of the nat. order Violaceæ, which are favorite flowers in all northern and temperate climates, and many of them among the first to make their appearance in the spring. The corolla is composed of five unequal petals; the roots are mostly perennial; the leaves are alternate and stipulated; and the flowers are pedunculate. More than a hundred species are known. The greatest favorites are *Viŏla odorāta*, or common sweet violet, and *V. tricolor*, or heart's-ease, the former being especially esteemed for its fragrance. The well-known pansies, so common as garden flowers, are but varieties of *V. tricolor* produced by cultivation.

Violet, one of the colors. See *Color, Spectrum,* etc.

Violet-wood. See *King-wood.*

Violin (vī'u-lin), a musical instrument, consisting of four cat-gut strings, the lowest of which is covered with silvered copper wire, stretched by means of a bridge over a hollow wooden body, and played with a bow. It is considered the most perfect of musical instruments, on account of its capabilities of fine tone and expression, and of producing all the tones in any scale in perfect tune. It forms with its cognates, the viola, violoncello or bass violin, and double-bass, the main element of all orchestras. The principal parts of the violin are the *scroll* or *head*, in which are placed the pins for tuning the strings; the *neck*, which connects the scroll with the body, and to which is attached the *finger-board*, upon which the strings are stopped by the fingers of the left hand as it holds the neck in playing; the *belly*, over which the strings are stretched, and which has two *f*-shaped sound holes, one on each side; the *back* or under side; the *sides* or *ribs*, uniting the back and belly; the *tail-piece*, to which the strings are fastened; and the *bridge*. The back, neck, and sides are generally of sycamore, the belly of deal, the finger-board and tail-piece of ebony. Almost all the different pieces are fastened together with glue. The four strings of the violin are tuned at intervals of fifths, G, on the upper space of the bass staff, D, A, E, reckoning upwards. Every intermediate semitone in its ordinary compass of 3½ octaves may be produced by stopping the strings with the fingers and the compass may be almost indefinitely extended upwards by the harmonics produced by touching the strings lightly. The *viola*, or tenor violin, has four strings tuned C (in the second space of the bass staff), D, A, G, reckoning upwards, and is an octave higher than the violoncello and a fifth lower than the violin. (See *Violoncello* and *Contrabasso.*) The violin can, to a limited extent, be made to produce harmony by sounding two or three strings together. The finest violins are by old makers, which cannot be imitated, and the precise cause of their superiority has never been satisfactorily explained. The Cremona violins stand in the first rank, the celebrated maker being the Stradivari (Straduarius), Amati, and Guarneri (Guarnerius); of German makers the most celebrated are Stainer or Steiner and Klotz; Vuillaume of the French, and Forrest of the English.

Violoncello (vī-u-lon-sel'ō, or chel'ō), a powerful and expressive bow instrument of the violin kind, held by the performer between the knees, and filling a place between the violin and double-bass. It has four strings, the two lowest covered with silver wire. It is tuned in fifths, C (on the second ledger-line below the bass staff), G, D, A, reckoning upwards, and is an octave lower than the viola or tenor violin. Its ordinary compass from C on the second ledger-line below extends to A on the second space of the treble, but soloists frequently play an octave higher.

Viper (vī'pėr), a name applied to various venomous serpents belonging to the family Viperidæ, suborder Viperina, and characterized, like other members of that section, by having no teeth in the upper jaw save the two

Head and Tail of Common Viper (*Pelias berus*).

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hollow poison-fangs. The common viper or adder (*Pelias berus* or *Vipĕra communis*), the only venomous serpent which occurs in Britain, appears to be very local in its distribution. It is generally of a brownish-yellow color, with zigzag markings and black triangular spots. Its bite is, as a rule, not fatal, but may induce pain, sickness, and fever. The food consists of frogs, mice, birds, eggs, etc. The viper is viviparous — retaining its eggs within the body till the young are hatched. Among other serpents denominated vipers are the death viper or adder (*Acanthŏphis antarctica*) of Australia; the horned viper or asp (*Cerastes Hasselquistii*) and plumed viper (*Clotho cornūta*) of North Africa. No species of viper is found in America, though *Heterodan niger* has been called the black viper.

Virchow (fēr'hō), Rudolph, a German pathologist and anthropologist, born in 1821, studied medicine at Berlin, and early became famous as a lecturer on pathological anatomy at Berlin University. His advanced liberal opinions during the movement of 1848 induced the government to deprive him (temporarily) of his appointment. In 1849 he accepted a chair at Würzburg, where he remained seven years, returning to Berlin in the autumn of 1856 as professor in the university and director of the pathological institute attached to it. He rendered immense service to medical science by his discoveries in regard to inflammation, ulceration, tuberculosis, and numerous other morbid processes of the human body, and had great influence on the whole of modern medicine, including hospital reform and sanitary science. After 1862 he was one of Bismarck's most powerful opponents in the Prussian parliament and Reichstag, and was made a member of important commissions, etc. In 1856 he was elected an honorary member of the Royal Society of Medicine, London; in 1859 a corresponding member of the French Academy of Medicine; and in 1873 a member of the Berlin Academy of Sciences. He was one of the founders of the German Anthropological Society, and an enthusiastic worker in this field, accumulating facts (partly in company with Schliemann) in Asia Minor, the Caucasus, Egypt, Nubia, etc. Among his important works are: *Cellular Pathology*, *Handbuch der Speziellen Pathologie und Therapie*, *Über den Hungertyphus*, *Die Aufgabe den Naturwissenschaften in dem neuen nationalen Leben Deutschlands*, *Die Freiheit der Wissenschaft im Modernen Staat*, and many others. Most of his medical works have been translated into English. He died Sept. 5, 1902.

Rudolf Virchow.

Virgil (ver'jil), full name, Publius Virgilius (or Vergilius), Maro, the most distinguished epic, didactic, and pastoral poet of ancient Rome, was born at Andes (probably *Pietola*), a little village near Mantua, October 15, 70 B.C. His father possessed a farm there, which he cultivated himself, and Virgil received a good education. He appears to have come to Rome about 41 or 40 B.C., when his estate was lost at the time of the agrarian division. It was restored to him, however, on application to Augustus, who henceforward became his patron. He also enjoyed the patronage of Mæcenas, and was intimate with Horace. His health was delicate, and his retiring nature led him to reside for the most part outside Rome, either at Tarentum or Naples. His *Eclogues*, a series of bucolic or pastoral poems, were written about 41-39 B.C. His *Georgics*, a poem on agriculture, was completed in B.C. 31. The *Æneid*, an epic in twelve books on the fortunes of Æneas (which see), was probably begun about B.C. 29. It occupied the author many years, and never received his finishing touches. In B.C. 20 Virgil appears to have engaged on a tour in Greece. But Augustus, having arrived at Athens on his return from the East, Virgil determined to accompany him home. At Megara, however, he fell sick, and he died at Brundusium, B.C. 19. His poems exhibit a remarkable command of language, and great taste and skill in the management of all the materials of poetry. He is unrivaled in beauty of versification. He was amiable and modest, free from envy and jealousy, and of irreproachable character. Mediæval

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of Duluth. It has iron mining interests. Pop. 10,473.

Virginia City, county seat of Storey Co., Nevada, is situated in a rocky region of the Sierra Nevada, at an elevation of 6205 feet. It owes its importance to its gold and silver mines, especially the famous Comstock Lode and the Big Bonanza, which were long the richest producers of silver in the United States. Pop. 2244.

Virginia Creeper, the *Parthenocissus quinquefolia*, a climbing plant, native of the United States, used as an ornamental covering for walls, etc., and sometimes called *American Ivy*.

Virginia Military Institute, a state school established in 1889 at Lexington, Va. The instructors hold commissions in the state militia and the students are organized as a military corps of cadets. During the Civil War the cadets were in active service for thirteen months.

Virginia University (officially *The University of Virginia*), near Charlottesville, Virginia, was chartered in 1819, and opened in 1824 under the rectorship of Thomas Jefferson. It enjoys state patronage, receives an annual grant of money, and has a library containing 75,000 volumes.

Virgin Islands (ver'jin), a group of small islands in the West Indies belonging to the United States and Great Britain. St. Croix, St. Thomas and St. John were purchased by the United States from Denmark in 1917. Culebra, Culebrita and Vieques also belong to the United States (formerly to Spain) and the rest of the group, Tortola, Anegada, Virgin and Gorda to Great Britain. The area of the group is about 150 square miles. See *Danish West Indies*.

Virginius Affair, THE, arose from the capture (October 31, 1876) of the United States steamer *Virginius* off Jamaica, by the Spanish warship *Tornado*. The ship was taken to Santiago, Cuba, and 52 of the passengers and crew were court-martialed and executed. The action of the local officials was disowned by the Spanish government.

Viscacha (vis-kä'chä; *Lagostomus trichodactylus*), a rodent animal of South America, allied to the chinchilla, about 2 feet long and stoutly built, with a short tail, inhabiting the pampas of the Argentine Republic, and living in burrows like the prairie dog of North America.

Vischer (fish'ĕr), PETER, a German sculptor, born at Nuremberg, Bavaria, in 1455, son of a worker in bronze. Little is known of his private life, but he attained great fame as an artist, and received orders both from German and foreign princes. His most celebrated work is the tomb of St. Sebaldas in Nuremberg, which contains seventy-two figures, besides those of the apostles and prophets. He died at Nuremberg in 1529.

Visconti (vis-kon'tē), an old Milanese family, celebrated for its political consequence and its patronage of science. The family reached the summit of its grandeur and splendor in the reign of Gian Galeazzo, who assumed the government in 1385. In later years it decreased in importance.

Viscount (vī'kount), a title of nobility next in rank to that of earl, and immediately above that of baron. It is the most recently established English title, having been first conferred by letters patent on John, Lord Beaumont, by Henry VI in 1440. The title is frequently attached to an earldom as a second title, and is held by the eldest son during the lifetime of the father. See *Peer, Nobility* and *Coronet*.

Vishnu (vish'nŏ), the second god of the Hindu triad (the others being Brahma and Siva), and by his special worshipers considered to be the greatest. In the early *Vedas* he appears as a manifestation of the sun, and he was not regarded as the most exalted deity, this rank being accorded to him by the later writers of the Rāmāyana, the Mahābhārata, and more especially of the Purānas. The Brahmanic myths relating to Vishnu are characterized by the idea that whenever a great physical or moral disorder affected the world, Vishnu descended in a small portion of his essence to set it right. Such descents are called *avatars*, or incarnations, and are generally given as ten, nine of which are already past, the tenth being yet to come. He is generally represented as having four arms, each hand holding some particular object, and as riding on a being half man half bird.

Vishnu on his Man-bird Garuda.

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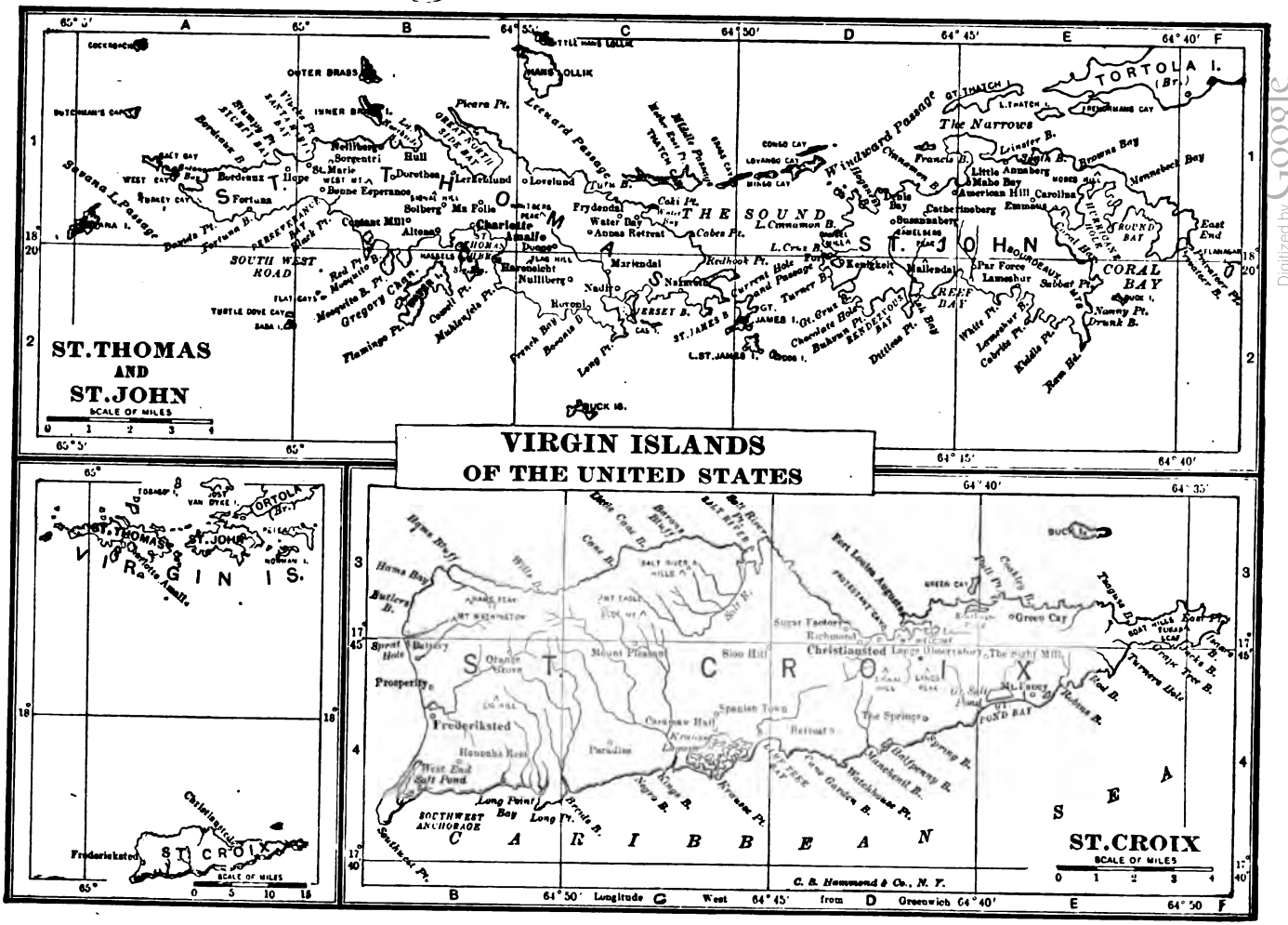
VIRGIN ISLANDS
OF THE UNITED STATES
ST. THOMAS
AND
ST. JOHN
SCALE OF MILES
ST. CROIX
SCALE OF MILES
C. S. Hammond & Co., N. Y.
Longitude West from Greenwich
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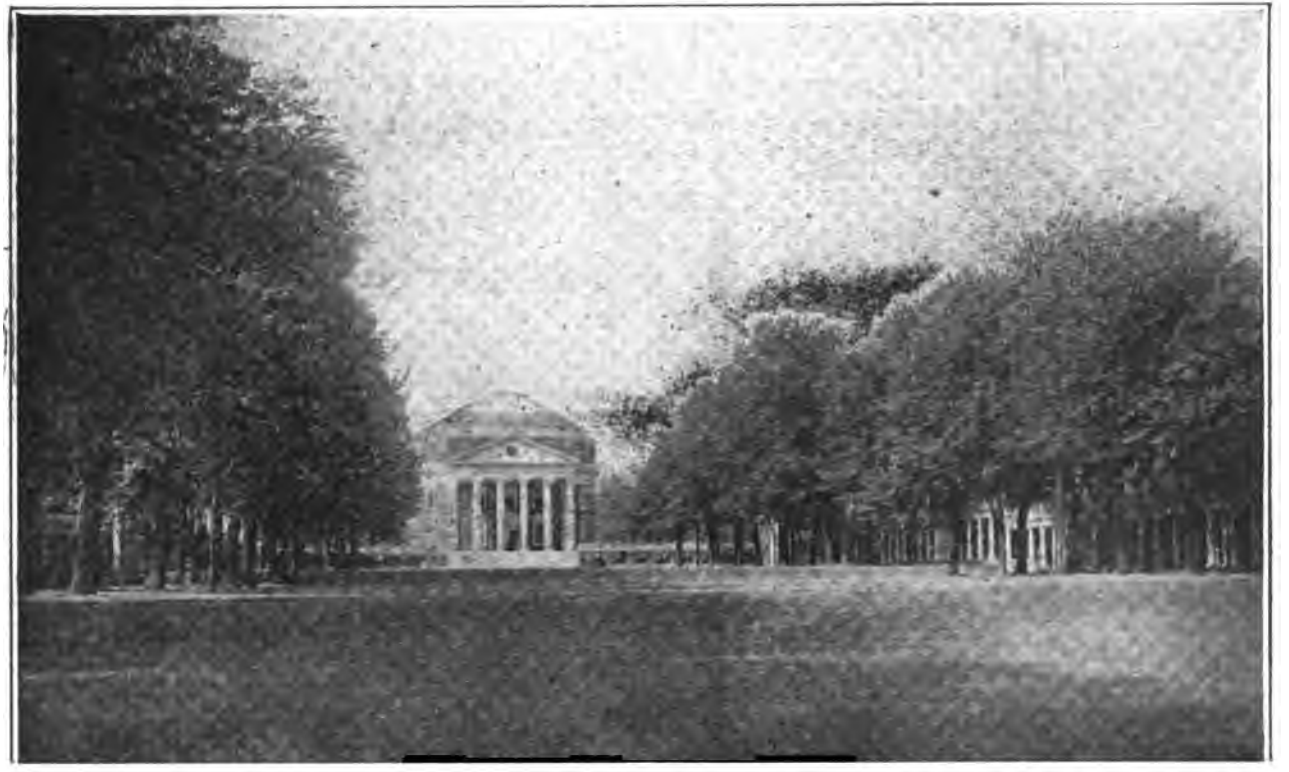

CAMPUS OF THE UNIVERSITY OF VIRGINIA

This beautiful institution is situated at Charlottesville, on the eastern skirts of the Blue Ridge Mountains, Virginia. It was originated by Thomas Jefferson, whose home, Monticello, stands a few miles distant, and he was its first rector.

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Visible Speech, a term applied by Prof. Alexander Melville Bell, its inventor, to a system of alphabetical characters designed to represent every possible articulate utterance of the organs of speech. The system is based on an exhaustive classification of the possible actions of the speech organs, each organ and every mode of action having its appropriate symbol. It is said that this invention is of great utility in the teaching of the deaf and dumb to speak, and in enabling learners of foreign languages to acquire their pronunciation from books.

Visigoth (vis'i-goth). See *Goths.*

Vision (vizh'un). See *Eye, Optics, Sight.*

Vistula (vis'tū-lȧ; German, *Weichsel,* vīk'sĕl), a river which rises in the Carpathians, traverses Galicia, Poland, and Prussia, and after a course of about 650 miles empties by several mouths into the Gulf of Danzig. It flows past the towns of Cracow, Warsaw, Bromberg, and Danzig, and is navigable from the first-mentioned place.

Vitaceæ (vī-tā'se-ē). See *Vine.*

Vitalians (vī-tā'li-anz). See *Apollinarians.*

Vitascope (vī'tȧ-skōp), an apparatus, under various names, by which instantaneous photographic pictures of moving objects are illuminated by the electric or calcium light and, while in rapid motion, projected upon a screen by an arrangement of powerful lenses. These magnify the objects represented on the 1¼ 'films' to life-size on the screen and portray the objects in motion. See *Moving Pictures.*

Vitebsk'. See *Vitepsk.*

Vitelline (vī-tel'lin) consists of casein and albumen, forming the yolk of birds' eggs.

Vitellius (vī-tel'li-us), AULUS, a Roman emperor, born about 15 A.D. He was a favorite with Caligula, Claudius and Nero, and was put by Galba in command of the German legions. His army soon proclaimed him emperor. Galba was slain by the partisans of Otho and a contest arose for the throne in which Otho was defeated and Vitellius recognized as emperor. Meanwhile Vespasian had been proclaimed at Alexandria, and one of his generals marched against Rome, defeated the supporters of Vitellius, and put him to death (69 A.D.).

Vitepsk (vē'tyepsk), or VITEBSK', a town in Russia, capital of the government of the same name, on the Dŭna, 315 miles S. of St. Petersburg. The streets are narrow and dirty, and the houses mostly built of wood. Its manufactures are woolen and linen cloth, leather, and mead. It has a considerable trade. Pop. 103,840.—The government has an area of 17,433 square miles. The surface is generally flat, and much occupied by woods and morasses. The whole drainage is carried to the Baltic. The soil suits rye better than any other grain. The only mineral of value is iron. Pop. 1,502,916.

Viterbo (vē-ter'bō), a town of Italy, in a fertile valley in the province of Rome, 40 miles N. W. of the city of Rome. It has a Gothic cathedral containing the tombs of several popes, an ancient Episcopal palace, and a town-hall. Pop. 17,344.

Viti Levu (vē'tē lā'vō), the chief island of the Fiji group. See *Fiji.*

Vitis (vī'tis), the typical genus of the order Vitaceæ, comprising the vines (which see).

Vitoria (vē-tō'rē-a), a town of Spain, in Biscay, capital of the province of Alava, 65 miles N. E. of Burgos. The chief buildings are four parish churches, a palace of deputies, an academy of music, theater, and prison. It has a Gothic cathedral built in the twelfth century, but with few features of interest. Leather, soap, etc., are manufactured. Pop. 33,617.

Vitrified Forts (vit'ri-fīd), the name given to certain prehistoric hill fortresses principally found in Scotland, but also in France and Germany. The materials of which they are constructed are perfectly or partially vitrified or transformed into a kind of glass by the action of heat. It is now generally believed that the vitrifaction was intentional, being effected by means of piled-up fuel.

Vitriol (vit'ri-ul), BLUE. See *Copper.*

Vitriol, GREEN, the same as copperas or sulphate of iron. See *Copperas.*

Vitriol, OIL OF, the common name for strong sulphuric acid (which see).

Vitruvius Pollio (vi-trō'vi-us pol'i-ō), MARCUS, a celebrated Latin writer on architecture, who flourished in the time of Julius Cæsar and Augustus, and wrote his work *De Architectura* probably about B.C. 13. This treatise is valuable as a compendium of the writings of numerous Greek architects.

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Vitry-le-François (vē-trē-le-frąn-swä), a fortified town of France, dep. Marne, on the river Marne. Pop. 8561.

Vittoria. See *Vitoria.*

Vitus' Dance, St. (vī'tus), or *Chorea,* a spasmodic or convulsive disease, allied to rheumatism, and due to an irritable condition of the spinal cord, in which the muscles of the extremities and other parts are thrown into various involuntary motions, and perform in an irregular manner those motions usually controlled by the will. The disease attacks both sexes, but chiefly the female, and is specially a disease of childhood, occurring in those who are of a weak constitution or improperly nourished. It generally appears from the eighth to the fourteenth year. In serious cases the spasmodic movements are violent and incessant, and speech and swallowing are interfered with.

Vivandiere (vi-van-di-ēr), a woman attached to French and other European continental regiments, who sells provisions and liquor. The dress of the vivandieres is generally a modification of that of the regiment to which they are attached.

Viverridæ (vi-ver'i-dē), a family of mammals containing the civits and allied tribes.

Viviparous Animals (vī-vip'a-rus), animals which bring forth their young alive. See *Reproduction.*

Vivisection (viv-e-sek'shun), the practice of operating with the knife upon living animals for the purpose of ascertaining some fact in physiology or pathology which cannot be otherwise investigated. It is also practiced in order to illustrate previously known facts, and to enable students to acquire operative dexterity. Vivisection for the latter purpose solely is condemned in the United States, but is carried on in the veterinary colleges in France. Though the term vivisection strictly is applicable to cutting operations only, it is generally employed for all scientific experiments performed on living animals, whether they consist of cutting operations, the compression of parts by ligatures, the administration of poisons, the inoculation of disease, the subjection to special conditions of food, temperature, or respiration, or to the action of drugs and medicines.

Vizagapatam (vē-zä-gu-pu-tŭm'), a town of British India, Madras Presidency, at the entrance of the Veragatam into the Bay of Bengal. It is a military station. Pop. 40,892.

Vizier (vi'zir; Arabic, *wazir,* a bearer of burdens), a title given to high political officers in the Turkish Empire and other Mohammedan countries. The president of the divan or prime minister is known as grand vizier.

Vlaardingen (vlär'din-gin), a town of the Netherlands, province of S. Holland, on the New Maas, a seat of the Dutch herring fishery. Pop. 17,000.

Vladikavkas (vlâ-dyē-kaf-kas'), a town of Russia, capital of Terek district, at the northern base of the Caucasus. Pop. 49,924.

Vladimir (vlâ-dyē'mēr), one of the oldest towns in Russia, capital of a government of the same name, 105 miles N. E. of Moscow. It has considerable manufactures, and a trade in fruit. During the thirteenth century it rivaled Moscow in importance. Pop. 39,-170.—The government has an area of 18,815 square miles, and a population of 1,730,400. There are important manufactures of linens and woolens, and several blast-furnaces.

Vladivostok (vlâ-dyē-vâs-tok'), a seaport town of Asiatic Russia, on the Siberian coast, Sea of Japan. It was founded in 1861, and since 1870 has been the chief station of the Russian Pacific fleet. Vast sums have been spent on wharves, shipyards, and arsenals, and it is the termination of one of the branches of the Trans-Siberian Railway. The trade is of growing importance and there are a number of manufactures. Pop (1911) 91,464.

Vliessingen (vlis'sin-gen). See *Flushing.*

Vocational Guidance, a new movement in education, having for its object the direction of young persons into vocations for which they are adapted.

Vocational Training. Movements to introduce into the schools instruction in agriculture, domestic science and the trades have been widespread in recent years; and experiments have given highly satisfactory results. Investigations have shown that the fourteen-year-old child who leaves school to find employment is ill-trained and unfamiliar with the needs of industry. To remove these conditions is the object of vocational training.

Voice (vois), the name given to the result of the production of sound in nearly all higher vertebrate animals. 'Speech' (which see) is a modification of 'voice.' In man the voice is produced by the *inferior laryngeal ligaments* (see *Larynx*). These 'vocal cords' consist of

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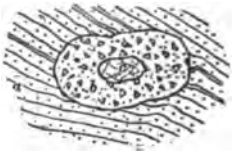
two elastic folds of mucous membrane, so attached to the cartilages of the larynx and to muscles that they may be stretched or relaxed and otherwise altered so as to modify the sounds produced by their vibration. The higher the note produced the greater is the tension of the cords; and the range of voice therefore depends upon the amount of tension which the cords can undergo. Regarding the compass and application of the voice in speaking and singing physiologists have noted three kinds of sequence. In ordinary speaking a monotonous sequence is observed, the notes having nearly all the same pitch, and the variety of the sounds being due rather to articulation in the mouth than to definite movements of the glottis and vocal cords. A passage from high to low notes, without intervals, forms the second kind of sequence; or the same sequence is observed in the passage from low to high notes. Such a sequence is exemplified in crying and howling both in man and in lower animals. The true *musical* sequence forms the third, in which the successive sounds have vibrations corresponding in relative proportions to the notes of the musical scale. The male voice admits of division into tenor and bass, and the female into soprano and contralto. The lowest female note is an octave or so higher than the lowest note of the male voice, and the female's highest note is about an octave above that of the male. The compass of both voices taken together is about four octaves, the chief difference residing in the pitch and also in the quality or *timbre*. The difference of pitch between the male and female voice is due to the length of the vocal cords, while the difference in timbre appears to result from differences in the nature and extent of the walls and cavity of the larynx, throat, and mouth. *Chest notes* differ from *falsetto* notes in that the former are natural notes produced by the natural voice, while the latter are produced by a stopping action on the cords. Finally it may be noted that the actual *strength* of the voice depends on the degree of vibration of the vocal cords, and also in a minor degree on the resonance of the larynx, lungs, and chest generally.

Volapük (vō'la-pük), the name given to a universal language invented by Johann Martin Schleyer, of Constance, after twenty years' labor. The name means 'world-speech,' being based on English *world* and *speak*, and a number of the vocables are modified English words. In structure the language is simple and extremely regular, and the orthography is entirely phonetic, the words being pronounced as they are written, and *vice versa*. The study of Volapük made some progress, but has been superseded by a new artificial language called Esperanto (which see).

Volatile Oils (vol'a-til). See *Oils*.

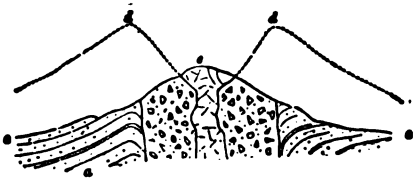
Volcano (vol-kā'nō), in a popular sense, a conical hill or mountain composed of material (volcanic ashes and lava) brought up by igneous forces from the interior of the earth through a pipe or vent. At the top there is a cup-shaped hollow called the crater. A volcanic eruption generally commences

Outline of Volcanic Neck.



Ground-plan of Volcanic Neck.

a, Surrounding strata. *b*, Volcanic vent. *c*, Core of lava.



Section of Volcanic Neck.

a, Surrounding strata. *s s*, Surface of ground. *c*, Crater. *d d*, Original cone, restored.

with the discharge of immense quantities of gases. This is followed by the ejection of ashes and hot fragments of rock. Lastly there is a flood of molten rock or lava. Volcanoes which show such outbursts more or less frequently are called *active* volcanoes; those which are known to have been active in historic times, but have long been quiescent, are called *dormant* or sleeping volcanoes; and those which present all the phenomena of volcanoes, but which have shown no activity in historic times, are called *extinct* or

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dead volcanoes. The mud volcanoes or *salses* of the Crimea and elsewhere (conical hills of slowly-flowing mud); the *fumaroles* (fissures from which steam issues); the *solfataras* (holes from which sulphurous fumes proceed) of Italy, etc.; the geysers and hot springs of the Yellowstone Park, Iceland, New Zealand, etc., are signs of weak or decreasing volcanic activity in the special districts in which they occur. Volcanoes may occur as isolated conical mountains, such as Vesuvius, Etna, or the Peak of Teneriffe. They also form various groups or systems of mountains. One remarkable fact in the distribution of volcanoes is their proximity to the sea, for out of 323 active volcanoes enumerated by Fuchs, all, excepting two or three in Central Asia and about the same number in America, are within a short distance at least of the ocean. There are certain regions over the whole of which active volcanic vents are distributed at intervals. Of these great regions that of the Andes is one of the best defined. An almost uninterrupted line of volcanoes stretches from the 46th degree of S. lat. in Chile to the north of Mexico, including Tunguragua, Cotopaxi, Antisana, Pichincha, Orizaba, Popocatepetl, Jorullo, etc. Another continuous line of volcanic action commences in the north of Alaska, passes through the Aleutian Isles over to Kamtchatka in N. E. Asia, then proceeds southward without interruption through a space of between 60° and 70° of latitude to the Moluccas. It includes the Kurile, Japanese, and Philippine Islands, traverses Java, Sumatra, Borneo, Celebes, New Guinea, and extends to various parts of the Polynesian Archipelago and New Zealand. A volcano in this series, on the island of Krakatoa, in the Straits of Sunda, burst into one of the most violent eruptions on record on the 26th of August, 1883. (See *Krakatoa.*) In the Old World the volcanic region extends from the Caspian Sea to the Azores, embracing the greater part of the Mediterranean and its most prominent peninsulas. Here volcanic action is most prominently visible in Vesuvius, Etna, and the Lipari Islands. Among disconnected volcanic groups may be mentioned Iceland (Mt. Hecla, in particular), the Sandwich Islands, and the island of Bourbon, Madagascar, and Mauritius. (See *Vesuvius, Etna, Hecla,* etc.) Also those of the West Indies, especially Mount Pelée in the island of Martinique, an outbreak of which on May 8, 1902, destroyed the city of St. Pierre and all its inhabitants, about 30,000 in number. (See *Pelée, Mount.*) Submarine volcanoes show a frequent existence, but such phenomena are for the most part inaccessible. In the present century several instances of the rise and disappearance of islands owing to volcanic action have been observed. Various theories have been proposed to account for the immediate cause of volcanic action. It is now generally accepted that it is produced by internal heat at a certain depth beneath the surface of the earth, and the evolution of a great body of elastic vapor, apparently in many cases due to the sudden vaporization of water which has made its way downward, expanding and seeking to escape where the least amount of resistance is presented, and manifesting itself in the explosions that accompany an eruption, or in the upheaval of rocks and the production of earthquakes. See also *Earth, Geysers, Earthquakes,* etc.

Vole (vōl; *Arvicŏla*), a genus of rodents closely allied to the rats and mice, and included in that family. Some are terrestrial, others aquatic. The common vole of Europe (*A. agrestis*), the meadow-mouse, or short-tailed field-mouse, is injurious to young plantations, devouring the bark and destroying

Common Vole (*Arvicŏla agrestis*).

the roots. It is reddish brown above and gray below. The water-vole (*A. amphibius*) or water-rat is much larger, and swims well though its feet are not webbed. It is of a pale or chestnut brown, tinted with gray. There are many other species in the Old and New World.

Volga (vol'gȧ), a river in Russia, the longest in Europe; rising in a small lake in the east of the Valdai Hills, and falling into the Caspian Sea by about seventy mouths, near Astrakhan, after a total estimated course of 2400 miles. Its basin is estimated at from 500,000 to 700,000 square miles. It flows generally southeast past Tver,

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Yaroslav, Kostroma, and Nijni-Novgorod to Kasan, thence south past Simbirsk and Saratov, and proceeds southeast from Sarepta to the Caspian. Its chief tributaries are the Kama on the left bank and the Oka on the right. It is navigable by barges from its source, and

communicates with the Caspian, Baltic, and Polar Seas by a system of canals. Its banks are fertile and well wooded, and its waters abound in fish, particularly sturgeon, carp, and pike of extraordinary size.

Volhynia (vol-in'i-a), a government in Southwest Russia; area, 27,690 square miles. The soil is fertile, producing all kinds of grain, particularly wheat; and fine breeds of cattle and horses are reared. The hills in the south are rich in iron. There are also considerable manufactures. The capital is Jitomir. Pop. 3,547,500.

Volition (vō-lish'un). See *Will*.

Volney (vol'ne), CONSTANTINE FRANÇOIS, a distinguished French author and traveler, born at Craon in 1757; died in 1820. He published in 1787 his *Travels in Egypt and Syria*, a work of high reputation, and in 1791 his *Ruins, or Meditations on the Revolutions of Empires*, a philosophical work which attracted great attention. Among his other works was one on the *Climate and Soil of the United States*.

Vologda (vō-log'dâ), a government in Northeast Russia; area, 155,033 square miles. The surface is for the most part covered with woods, lakes, and morasses. Its forests furnish considerable quantities of timber and charcoal. Pop. 1,365,587.—The capital is VOLOGDA, on a river of the same name, in a beautiful district, 85 miles E.S.E. of St. Petersburg. Pop. 27,822.

Volsci (vol'sī), an ancient Italian tribe who dwelt in Latium, on both sides of the river Liris (Garigliano). Their principal city was Corioli, from which Coriolanus derived his surname. After having several times endangered the Roman State they were conquered, and disappeared from history (388 B.C.).

Volta (vol'tâ), ALESSANDRO, an Italian natural philosopher, born at Como in 1745; died there in 1827. Two treatises, published in 1769 and 1771, in which he gave a description of a new electrical machine, laid the foundation of his fame. He was successively professor of physics at the gymnasium in Como and in the University of Pavia, where he invented the electrophorus and electroscope. He also devised several other electrical appliances, and in 1800 the voltaic pile (which see). In 1728 he made a tour through France, Germany, England and Holland. In 1801 Napoleon invited him to France, where a medal was struck in his honor. In 1810 he was created a senator of Italy, with the title of count; and in 1815 was made director of the philosophical faculty of Padua.

Voltaic Electricity (vol-tā'ik), galvanic electricity, galvanism. See *Galvanic Battery* and *Galvanism*.

Voltaic Pile, Volta's arrangement for producing a current of electricity, consisting of a pile of alternate disks of two dissimilar metals, as copper and zinc, zinc and silver, zinc and platinum, separated by pieces of flannel or pasteboard moistened with salt water or with water acidulated with sulphuric acid.

Voltaic Pile.
p, positive, *n*, negative end.

Voltaire (vol-tār), FRANÇOIS MARIE AROUET DE, a celebrated French writer, born at Paris, November 21, 1694; died there May 30, 1778. His father was François Arouet, a notary, and he was destined for the legal profession, but abandoned the law for letters. In 1718 a tragedy named *Œdipe*

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was brought out by him, and was a great success. It is said that this play was finished, and that two cantos of his epic the *Henriade* were written in the Bastille, where he was confined from May, 1717, to April, 1718, for writing certain satirical verses on the regent. He now became the fashionable poet and resided mainly at Paris, leading a life of gayety and pleasure in the society of the great. It was about the beginning of this period that he adopted the name of Voltaire. In 1726 he was again imprisoned in the Bastille for sending a challenge to the Chevalier Rohan, by whom he had been grossly insulted. He was liberated within a month, and went to England on the invitation of Lord Bolingbroke. Here he resided till 1729 in friendship with the leading deists, and acquired some knowledge of English literature. His *Henriade* was completed and published by subscription in England. After his return to France he lived chiefly at Paris till 1734. During this period he raised himself from very moderate circumstances to a condition of affluence by successful monetary speculations. From 1734 to 1749 he resided with the Marchioness de Châtelet at Cirey, in Lorraine. She died in 1749, and Voltaire then accepted the oft-repeated invitations of Frederick the Great to come and live at his court at Potsdam. Here he was received with great honor, but a series of disagreements with the king ended in Voltaire's retirement from the Prussian court in 1753. He then resided for a short time at Strasburg, Colmar, and Lyons, removing at the end of 1754 to Geneva. For almost the whole of the remainder of his life he lived in Switzerland, or close to its borders. In 1760 or 1761 he fixed his residence with his niece, Madame Denis, at Ferney, where he received a constant succession of distinguished visitors, and maintained a correspondence which included in its range most of the crowned heads of Europe. In Feb., 1778, he went to Paris, where he was received with enthusiasm by all classes. But the excitement of the occasion hastened his death. His works embrace almost every branch of literature; poetry, the drama, romance, history, philosophy, and even science. Hatred of fanaticism and superstition was his chief characteristic, and nearly all his works are strongly animated by a spirit of hostility to the priests and the religion they represented. He upheld theism, however, with as much zeal as he denounced Christianity and priesthood. Voltaire's literary fame chiefly rests on his philosophical novels: *Zadig*, *Candide*, *L'Ingénu*, etc.; his histories: *Siècle de Louis XIV*, and *Histoire de Charles XII;* his correspondence; and more than all, perhaps, on his poetical epistles, satires, and occasional light poems, which all exhibit wit, gayety, vivacity, and grace. Several of his tragedies, such as *Zaire*, *Alzire*, *Merope*, *Mahomet*, had great success in their day, but are not assigned a high place in French literature. His comedies, the best of which is *L'Enfant Prodigue*, were less successful. His *Henriade*, an epic poem, had great success, and exercised a powerful influence when it first appeared, but is not highly esteemed now. His *Pucelle*, dealing in mock-heroic manner with the history of Joan of Arc, abounds in obscene passages, and treats sneeringly of religion, virtue and all that men hold most sacred, but is viewed by Brougham as 'the great masterpiece of Voltaire's poetic genius.'

Voltameter (vol-tam'e-ter), an instrument in which a current of electricity is made to pass through slightly acidulated water, and as the water is thus decomposed, oxygen and hydrogen being liberated, the quantity of electric current passing through in a given time may be ascertained in terms of the quantity of water decomposed.

Volterra (vōl-ter'â; ancient *Volaterræ*), a town in Italy, province of Pisa, 33 miles southwest of Florence. It was anciently one of the twelve principal cities of Etruria, is surrounded by Etruscan walls, and possesses a museum rich in Etruscan antiquities. Pop. 5522.

Volterra, DANIELE DA. See *Ricciarelli.*

Voltmeter (volt'mē-ter), an instrument for measuring the pressure, electromotive force, or difference of potential at the ends of an electric current. There are a number of such instruments, of which the gold-leaf electroscope may be considered a crude example.

Volturno (vol-tōr'nō), a river of Italy, rising in the province of Campobasso, flows S.E. to its junction with the Calore, and then west past Capua into the Mediterranean.

Volunteers (vol-un-tērz'), citizens who of their own accord offer the state their services in a military capacity without the stipulation of a substantial reward. The oldest volunteer force in Great Britain is the Honorable Artillery Company of the city of London, which received its charter of incorporation from Henry VIII. In

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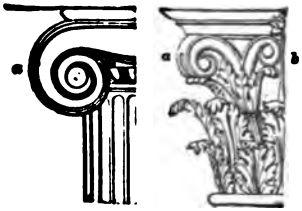
case of a war of magnitude the United States has always relied on its volunteer soldiery. During the Civil War, including reënlistments, there were 2,656,533 men in the field—the great body of whom were volunteers.

Volunteers of America, a religious and philanthropic organization, founded in 1896 by Commander and Mrs. Ballington Booth, formerly of the Salvation Army, in part as a protest against the rigid militarism of that body. Over 100



Volutes of the Ionic and Corinthian Capitals.
a a, Volutes. *b*, Helix.

stations for philanthropic work are in operation in the United States, and activities are being extended to other lands.

Volute (volūt'), in architecture, a kind of spiral scroll used in the Ionic, Corinthian, and Composite capitals, of which it is a principal ornament. The number of volutes in the Ionic order is four. In the Corinthian and Composite orders they are more numerous, in the former being accompanied with small ones, called *helices*.

Vomer (vō'mer), in anatomy, one of the bones of the skull, forming in man part of the septum or division between the cavities of the nostrils. In fishes it is a feature of importance for classification purposes.

Vomit (vom'it) to expel matters forcibly from the stomach through the œsophagus. At times it is sympathetic, as in affections of the kidneys, uterus, brain, etc. At others it is symptomatic, as in gastritis, peritonitis, etc.

Vondel (von'del), JOOST VAN DEN, one of the most celebrated poets of Holland, born in 1587; died in 1659. His works display so much genius and elevated imagination that he has been called the Dutch Shakespeare. They include metrical versions of the Psalms, of Virgil, and of Ovid, together with satires and tragedies. Of the latter *Palamedes*, the *Conquest of Amsterdam*, and *Lucifer* are considered the masterpieces of Dutch tragedy.

Von Holst, HERMANN EDWARD, a distinguished historian, born at Fellin, Livonia, in 1841. He was professor of history at Strassburg and Freiburg, and at the University of Chicago after 1892. He wrote *Constitutional History of the United States*, *Constitutional Law of the United States*, lives of John C. Calhoun, John Brown, etc.

Voodou, or Voudoo (vō'dō), the name given by the negroes of the United States and the West Indies to certain superstitious rites and beliefs brought from Africa, also to the sorcerer who practiced these rites. If the negro wished to destroy an enemy he sought the aid of the voodou 'doctor,' who would often undertake to remove the designated party. This, it is thought, was usually done by the aid of poison, though apparently by incantations. At one time no slave could be induced to expose himself to the wrath of one of these conjurers, and in many cases the victim of a voodou is thought to have died from sheer fright, all hope being given up when he believed he was under the fatal spell. Voodouism flourished most in this country in the rice, cotton, and sugar plantations of the far South, where the negroes were less immediately under the influence of their masters than those living farther north.

Vorarlberg (fōr'ärl-berg), a western district of Austria-Hungary, officially included in the Tyrol. Area, 1005 square miles; pop. 129,237.

Voronej (va-rō'nyesh), a town of Russia, capital of the government of the same name, on the Voronej, 290 miles S.S.E. of Moscow. It is an important entrepôt on the railway between Moscow and the Sea of Azov. It has manufactures of woolen and linen cloth, soap and vitriol, tanneries, and a considerable trade. Pop. 84,146.—The government has an area of 25,440 square miles, and a pop. of 3,097,700. It is intersected by the Don, which receives the whole of the drainage, partly through its tributaries, the Voronej and Khoper. The soil is generally fertile, and large crops of grain are raised.

Vortex (vor'teks), the form produced when any portion of a fluid is set rotating round an axis. Familiar examples are seen in eddies, whirlpools, waterspouts, whirlwinds, and on a larger scale in cyclones and storms generally. Descartes supposed certain vortices to exist in the fluid or ether of space endowed with a rapid rotatory motion about an axis, and filling all space, and by these he accounted for the motions of the universe.

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Vortex Ring, in physics, a vortical molecular filament or column returning into itself so as to form a ring composed of a number of small rotating circles placed side by side, like beads on a string, as the singular smoke-rings which are sometimes produced when a cannon is fired, or when a smoker skillfully emits a puff of tobacco smoke. Recent investigations of the motion of vortices suggested to Lord Kelvin the possibility of founding on them a new form of the atomic theory, and the vortex atom was for a time widely accepted by scientists, but was finally abandoned by its author as mathematically incapable of demonstration.

Vorticella, or 'BELL-ANIMALCULE,' a genus of stalked infusoria, having a fixed stem capable of being coiled into a spiral form, and vibratile organs called cilia fringing the bell-shaped disc or head, which are constantly in rapid motion and attract particles of food. The species are very numerous in fresh water, and are generally microscopic.

Vosges (vōzh), a chain of mountains about 100 miles long, extending N. N. E. to S. S. W. along the frontiers of France and Alsace, nearly parallel with the Rhine. The breadth varies from 20 to 45 miles, and the highest peak is Ballon-de-Guebwiller, 4685 feet. A great part of the Vosges is densely wooded, and the eastern and southern slopes are often covered with vineyards. There is also excellent pasturage. The Ill, Lauter, Moselle, Meurthe, Saar and Saône rise in this chain.

Vosges, an eastern frontier department of France; area, 2279 square miles. It is bounded on the east by the Vosges Mountains, which send out ramifications over the greater part of its surface, while in the south it is traversed by the chain of the Faucilles. Grain, hemp, flax and potatoes are extensively grown, and the department is famous for its kirsch-wasser. It was in this mountainous region that France struck its first blows in the European war. While Germany was invading Belgium, France drove strongly into the Vosges uplands, penetrating Alsace as far as Mulhausen. But its forces were eventually driven back nearly to the frontier. They held the steep escapement facing the valley of the Rhine against all the efforts of the German army to displace them until the tide of war drew their forces to the more westerly region, when the Vosges campaign ended. The principal rivers are the Meuse, Mouzon, Madon, Moselle, Saône and Meurthe, all unnavigable within the department. The minerals are valuable. The manufactures are various. Épinal is the capital. Pop. 429,812.

Voss (fos), JOHANN HEINRICH, a German poet and translator, born in 1751. He received a scanty school education, served for a time as private tutor in a family, and in 1772 went to Göttingen, where he studied the classical and modern languages, and was one of the founders of the Göttingen Dichterbund, or poets' union. In 1775 he retired to Wandsbeck in order to edit the *Musenalmanach*, which he published till 1800. In 1778 he became rector of a school at Otterndorf, in Hanover, and in 1782 went as rector to Eutin. In 1805 he became professor at Heidelberg, where he remained till his death in 1826. Between 1785 and 1802 he published several volumes of original poems, the best of which is the idyllic *Luise*. As a translator Voss exhibited great skill in the handling of meters, and a wonderful command of language. Among his translations that of Homer's works is undoubtedly the greatest, being the classical German version of these great epics. A translation of Shakespeare, which he undertook with his sons, was published in nine volumes in 1829.

Vossius (vosh'e-us), GERHARD JOHANN, a Dutch classical scholar, born in 1577, studied at Dordrecht and Leyden. In 1614 he undertook the direction of the theological college at Leyden, and subsequently became professor of rhetoric and chronology. Favoring the Remonstrants, he became obnoxious to the prevailing party in the church, and was deprived of his office. Archbishop Laud then conferred on him a prebendary stall at Canterbury, with permission to continue his residence in the Netherlands. In 1633 he was invited to Amsterdam, to occupy the chair of history, and continued there till his death in 1649. Several of his sons, especially Isaac, also distinguished themselves as scholars.

Voussoirs (vös'wärz), the wedge-shaped stones which form an arch. The under sides of the voussoirs form the intrados or soffit of the arch, and the upper sides the extrados. The middle voussoir is the keystone.

Vowel (vou'el), a simple articulated sound, which is produced merely by voice proceeding from the larynx, modified by a greater or less elevation or depression, expansion or contraction of the tongue, and contraction

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or expansion of the lips. The vowel sounds of the English alphabet are imperfectly represented by five letters, *a*, *e*, *i*, *o*, *u* (and sometimes *w* and *y*). Vowels are distinguished from consonants in that they result from an open *position* of the vocal organs, while consonants are the result of an opening or shutting *action* of the organs; thus the former can be pronounced by themselves, while consonants require to be sounded with the aid of a vowel.

Vulcan (vul'kan; Latin *Vulcānus*), in Roman mythology, the god who presided over the fire and the working of metals, and patronized handicraftsmen of every kind. By some writers he is said to have been born lame, but by others his lameness is attributed to his having been thrown from Olympus. He was completely identified with the Greek Hephæstus (which see).

Vulcan, from an antique.

Vulcanite (vul'ka-nīt), a kind of vulcanized caoutchouc, differing from ordinary vulcanized caoutchouc in containing a larger proportion of sulphur — from 30 to 60 per cent. — and in being made at a higher temperature. It is of a brownish-black color, is hard and tough, cuts easily, and takes a good polish, on which account it is largely used for making into combs, brooches, bracelets, and many other ornaments. As it is especially distinguished by the large quantity of electricity which it evolves when rubbed, it is much used in the construction of electric machines. See *Vulcanization*.

Vulcanization (vul-kan-i-zā'shun), a method of treating caoutchouc or India-rubber with sulphur to effect certain changes in its properties, and yield a soft (*vulcanized India-rubber*) or a hard (*vulcanite*) product. Other ingredients, as litharge, white-lead, whiting, etc., are added to the sulphur to give color, softness, etc. The substance thus formed possesses the following properties: it remains elastic at all temperatures, it cannot be dissolved by the ordinary solvents, neither is it affected by heat within a considerable range of temperature; finally, it acquires extraordinary powers of resisting compression, with a great increase of strength and elasticity. See *Vulcanite* and *India-rubber*.

Vulgar Fractions. See *Fractions*.

Vulgate (vul'gāt), the Latin translation of the Bible, which has, in the Roman Catholic Church, official authority, and which the Council of Trent, in their fourth session, on May 27, 1546, declared 'shall be held as authentic in all public lectures, disputations, sermons, and expositions; and that no one shall presume to reject it, under any pretense whatsoever.' Even in the early period of the church a Latin translation of the Old Testament existed, called *Itala*, made after the Septuagint. St. Jerome found that this translation was not always accurate, and between 385–405 A. D. made a new Latin translation from the Hebrew, which, however, was only partially adopted by the church. In the sequel the translations were combined, and formed the *Vulgate* (*versio vulgāta*, common or usual version). This grew up between the eighth and sixteenth centuries. The version now in use is the edition published by Clement VIII in 1592 (improved edition 1593).

Vulture (vul'tūr), the common name for the raptorial birds belonging to the family Vulturidæ, characterized by having the head and part of the neck destitute of feathers, and a

Egyptian Vulture (*Neophron percnoptĕrus*).

rather elongated beak, of which the upper mandible is curved at the end. The strength of their talons does not correspond with their size, and they make more use of their beak than of their claws and are unable to carry off their

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prey, like the eagles and hawks. In general they are of a cowardly nature, living chiefly on dead carcasses and offal. Their wings are very strong and give them remarkable powers of swift and long sustained flight. Unlike other birds of prey the female is smaller than the male. Their geographical distribution is confined chiefly to warm countries, where they act as scavengers to purify the earth from the putrid carcasses with which it would otherwise be encumbered. The griffon vulture (*Vultur fulvus*) inhabits the mountainous parts of the south of Europe, as does also the cinereous or brown vulture (*V. cinerĕus*). The former measures nearly 4 feet from tip of beak to end of tail. The bearded vulture, or lämmergeier (*Gypaëtos barbātus*), inhabits the Alps, Asia, and Africa. The Egyptian vulture (*Neophron percnoptĕrus*) is often called 'Pharaoh's Chicken' from its frequent occurrence in ancient hieroglyphics, where it is used as an emblem of paternal love. This bird is very common in Northern Africa and Persia and is frequently seen in the south of Europe. It is about 2 feet long, has pointed wings, and is raven-like in form. Greatest among the vultures are the lämmergeier, 4 feet in length, the king vulture (*Sarcorhamphus papa*) of South America, and the giant condor (*Sarcorhamphus condor* or *gryphus*) of the Andes, the largest of the family, and the most powerful flyer among birds. The turkey-buzzard (*Cathartes aura*), about 2½ feet long, is common in the eastern United States and is protected in southern cities for its services as a destroyer of carrion. See *Condor*, *Egyptian Vulture*, *King Vulture*, *Lämmergeier*, and *Turkey-buzzard*.

Vyatka (vyât'kà), a city of Russia, capital of a government of the same name, is situated on Vyatka River, 280 miles N. E. of Nijni-Novgorod. It is largely engaged in the corn trade and the manufacture of wax and tallow candles. Pop. about 20,000.—The government has an area of 59,239 square miles, and a pop. of over 3,000,000.

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W

W, the twenty-third letter of the English alphabet, representing a consonantal sound formed by opening the mouth with a contraction of the lips, such as is performed in the rapid passage from the vowel sound *u* (*oo*) to that of *i* (*ee*). The character is formed, as its name indicates, by doubling the *u* or *v*. At the end of words or syllables it is either silent, as in *low*, or it modifies the preceding vowel, as in *new*, *how*, having then the power of a vowel.

Waal (väl), a branch of the Rhine. See *Rhine*.

Wabash (wą'bash), a river, the most important northern tributary of the Ohio. It rises in the N. W. of Ohio, winds across Indiana, forms the boundary between Indiana and Illinois, and falls into the Ohio after a course of 550 miles. It is navigable for steamboats to La Fayette, and connects Lake Erie with the Ohio by the Wabash and Erie Canal.

Wabash, a city, capital of Wabash Co., Indiana, on the Wabash River, 47 miles S. W. of Fort Wayne. It has active manufactures of furniture, paper, machinery, hats, large railroad shops, etc.; in the vicinity is excellent building stone. Pop. 8687.

Wace (wäs), an Anglo-Roman poet, native of Jersey, born in 1115; died in 1184. Two important works by him remain, the *Brut d'Angleterre* (see *Layamon*), and the *Roman de Rou*, a history of Rollo and the dukes of Normandy, including the conquest of England.

Waco (wā'kō), a city, county seat of McLennan county, Texas. It is situated on the Brazos River, 100 miles N. E. of Austin, and as the center of a large and fertile cotton and wheat growing district, commands a large trade in agricultural products. Its industries include flour and cotton-seed oil mills, brick, tile and bottle works, etc. It has warm and medicinal artesian waters. Pop. 42,000.

Wadai, or WADAY (wä-dī'), an extensive negro state in the central Soudan, between Kanem and Bagirmi in the W. and Darfur in the E., with a pop. estimated at about 2,000,000. It consists principally of an elevated plateau, very fertile in some parts, but extending into the Sahara and largely arid. Its fertile districts produce abundantly maize, millet, indigo, cotton, etc. The prevailing religion is Mohammedan. Formerly very powerful and warlike, it is now a protectorate of France, constituting part of the Lake Chad territory or *Hinterland* of French Congo. Capital Abeshr.

Wade (wād), BENJAMIN FRANKLIN, statesman, born at Springfield, Massachusetts, in 1800; died in 1878. He studied law, was admitted to the bar in Ohio in 1825, and elected state senator 1837 and 1841, made judge in 1847, and elected United States senator by the Whigs in 1851, remaining in the senate till 1869. He advocated the Homestead bill, voted for the repeal of the Fugitive Slave Law, opposed the Kansas-Nebraska bill of 1854, and during the Civil war was prominent in public affairs. He was elected president of the senate in 1867, and was a prominent candidate for the vice-presidency in 1868.

Wade, JAMES FRANKLIN, military officer, born in Ohio in 1843. He entered the army as lieutenant in 1861, served with distinction throughout the war, was brevetted brigadier-general of volunteers in 1865, entered the regular army, and rose in rank from major in 1866 to brigadier-general in 1897. He took an active part in the war with Spain and was made military governor of Cuba in 1899. He subsequently served in the Philippines as major-general, commanded the Atlantic division 1904-07, and retired in 1907.

Wadelai (wä-dē-lī'), a military post in the Equatorial Province of what was formerly the Egyptian Soudan, on the Albert Nyanza, now in the Congo Free State, about 35 miles N. of the Albert Nyanza. It is famous as the chief station of Emin Pasha. See *Shnitzer*.

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Wading Birds. See *Grallatores.*

Wadi (wä'di), a watercourse; chiefly one that is dry part of the time.

Wafer (wā'fer), a thin circular cake of unleavened bread, generally stamped with the Christian monogram, the cross, or other sacred symbol, used in the Roman Catholic Church in the administration of the Eucharist.—Also a small disc of dried paste usually made of flour and water, gum and coloring matter, used for sealing letters, etc.

Wager (wā'jer), a bet or something staked on the event of a contest or some unsettled question. The party whose opinion proves to be correct receives what has been staked by both. By statutes of England, Scotland, and the United States all contracts or agreements, whether by parole or in writing, depending on wagers, are null and void, and money due thereon cannot be recovered in any court of law. A wager is therefore merely a debt of honor.

Wages (wā'jez), generally speaking, the payment given for personal services; but the term is now usually restricted to the money paid at short intervals for mechanical or muscular labor, other than that performed by the more educated classes, to which the word *salary* bears reference. In some States wages can be legally attached for debt.

Wagner, CHARLES, a French writer, born in Alsace in 1852. He became an evangelist, inculcating simple Christianity divested of dogmatism, and attracted great attention by *The Simple Life,* in which this principle was maintained. Other works were *Youth, Courage,* etc. He lectured in the United States in 1904.

Wagner (väh'nèr), WILHELM RICHARD, one of the most celebrated of modern composers, born at Leipzig in 1813; died at Venice, Feb 13, 1883. He received his education at Leipzig and Dresden. From 1834 he filled various musical engagements at Madgeburg, Riga and Königsberg. In 1839-41 he went to Paris and London, and composed his operas of *Rienzi* and the *Flying Dutchman.* The brilliant success of these operas secured him the conductorship at the Royal Opera of Dresden in 1843. He joined the insurrectionary movement of 1848-49, and was compelled to exile himself. Until his return to Germany in 1864 he spent most of his time in Switzerland, Italy, Paris and London. His *Tannhäuser* and *Lohengrin* appeared in 1845 and 1850, respectively. The late King of Bavaria, Louis II, became an enthusiastic and liberal patron of Wagner, and the theater at Baireuth, especially built for Wagner, was chiefly supported from the king's purse. Here his famous tetralogy *Der Ring des Nibelungen,* consisting of *Das Rheingold, Die Walküre, Siegfried* and *Götterdämmerung,* was first performed in 1876 before an unusually brilliant and appreciative audience. About a year before his death he produced his last creation, *Parsifal.* In 1870 he had married, as second wife, Cosima von Bülow, a daughter of the Abbé Liszt. Wagner labored to reform dramatic

Wilhelm Richard Wagner.

music according to the ideas of Gluck and Weber, and gave his creations a national character by selecting his subjects from old German heroic legends. His theory (not in itself specially original) was that in a perfect musical drama the three arts, poetry, music, and dramatic representation, should be welded together into one well-balanced whole. This theory he demonstrated with consummate ability and unsurpassed magnificence. His particular views on music are embodied in a well-known work entitled *Oper und Drama.*

Wagram (vä'gram). a village of Lower Austria, on the left bank of the Rossbach, 12 miles N. E. of Vienna, famous for the great battle in 1809 between the French under Napoleon and the Austrians under the Archduke Charles, each about 150,000 strong. The battle was well contested, but the result gave Napoleon a decisive victory, which was followed up by an armistice and the treaty of Schönbrunn (October 14).

Wagtail (wag'tāl), a name of birds included in the family of the warblers, and so termed from their habit of jerking their long tails when running or perching. They inhabit

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meadow lands and pastures, frequent water pools and streams, are agile runners, and have a rapid flight. Their food consists of insects. Their nests, built on the ground, contain from four to six eggs. These birds belong to both Old and New Worlds, and migrate southwards in winter. Representative varieties, distributed principally over the European continent and the East, are the white wagtail (*Motacilla alba*); the gray wagtail (*M. campestris* or *Boarula*); and the yellow or Ray's wagtail (*M. sulphurea* or *Budytes Rayi*).

Wah. See *Panda*.

Wahabees (wȧ-ha'bēs), WAHA'BIS, or WAHA'BITES, a Mohammedan sect, founded in Arabia about 1760 by Abd-el-Wahâb, an oriental scholar of high attainments. He deemed it his mission to restore Islamism to strict harmony with the teachings of the Koran and the Sunna. Thousands flocked to the Wahabee standard, and enabled the reformer to secure the whole of his native province Nejd, and to carry his victorious arms into Yemen. Under his successors the greater part of Arabia fell under the Wahabee power. Mecca and Hejaz were captured in 1803, and the loss of the sacred city roused the Turks to action. Several expeditions were sent from Egypt, and in 1818 Ibrahim Pasha was at last successful in dispersing the Wahabee forces, in capturing their capital, Derayeh, and their leaders, who were executed at Constantinople. The Wahabees, however, gradually regained their influence, especially in their native homes of Nejd, where they form at present an independent state of Arabia. The latest statistics of Islamism estimate their number at four millions.

Waikato (wā-kä'tō), one of the principal rivers of New Zealand, in the North Island; length, about 200 miles. It traverses a district of great fertility.

Wainscot (wān'skot), the name given to paneled boards (usually oak or chestnut) employed to line the internal walls of an apartment. Wainscoting of oak was commonly used in England for interior lining in Elizabethan and Stuart times.

Wainwright (wān'rīt), RICHARD, naval officer, born at Washington in 1849, was graduated from the Naval Academy in 1868, became lieutenant commander, and was executive officer in the *Maine* when the ship was blown up in Havana harbor in 1898. He commanded the *Gloucester* in the naval fight at Santiago and sunk two Spanish torpedo-boat destroyers. He is now a rear-admiral in the navy.

Waite (wāt), MORRISON REMICK, jurist, born at Lyme, Connecticut in 1816; died in 1888. He was graduated from Yale College in 1837, became a prominent lawyer in Ohio, and in 1874 became Chief Justice of the Supreme Court of the United States.

Waits (wāts), the name given at one time to the king's minstrels, whose duty it was to guard the streets at night and proclaim the hour; to the musicians of a town; and to private bands when employed as serenaders. The term is now applied in England to those who sing or play carols on Christmas and New Year's Eve with a view to donations.

Waitzen (vīt'sen), or VÁCZ (vāts), a market town and bishopric of Hungary, on the left bank of the Danube, 20 miles N. of Budapest. It has a splendid cathedral and several monastic and scholastic establishments. Pop. 16,808.

Wakatipu (wä-kä-tē'pō), a picturesque lake in the South Island of New Zealand; area, 112 acres. Queenstown and Glenorchy, on the borders of the lake, are favorite tourist resorts, on account of the magnificent mountain scenery in the vicinity.

Wake (wāk), a term corresponding originally to *vigil*, and applied to a festival held on the anniversary of the day on which the parish church was consecrated and dedicated to a saint. A *lyke* or *lich wake* (Anglo-Saxon, *lic*, a corpse) is the watching of a dead body by night by the relatives and friends of the deceased. The practice, once general, is now confined to the lower Irish classes, and is frequently accompanied by scenes much out of keeping with the sad occasion.

Wakefield (wāk'fēld), a municipal and parliamentary borough of England, in the West Riding of Yorkshire, on the Calder, 9 miles S. of Leeds. It is well built, with wide and regular streets, and several fine public buildings. Leeds, Bradford, and Halifax have to a great extent absorbed the woolen manufactures of Wakefield, but there are still several important establishments, and the trade in wool, corn, flour, and malt is very extensive. Wakefield was created a bishopric in 1888. Pop. 51,516.

Wakefield, a town (township) of Middlesex Co., Massachusetts, 10 miles N. of Boston. It has important manufactures of rattan and knit goods, boots and shoes, stoves, pianos, etc. Pop. 12,000.

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Walcheren (väl'ke-rĕn), an island of Holland, province of Zeeland, at the mouth of the Scheldt. It is level, below high-water mark, very fertile, populous, and prosperous. It contains the thriving towns of Flushing, Middelburg (capital) and Veere. Pop. about 40,000.

Wolcott (wol'kot), CHARLES DOOLITTLE, geologist, born at New York Mills, New York, in 1850. He studied geology, became assistant on the New York and afterwards on the United States Geological Survey, and director of the latter in 1894. He wrote *The Trilobite*, *The Cambrian Fauna of North America*, etc.

Waldeck (väl'dek), a small principality of Western Germany, under Prussian administration, consisting of the two separate territories of Waldeck and Pyrmont; total area, 433 square miles; pop. 59,127. It is chiefly agricultural. The reigning house is one of the most ancient in Germany.

Waldenses (wal-den'sēz), a Christian sect which owes its origin to Peter Waldus (Waldo), a rich citizen of Lyons. About 1170 Waldo by his preaching collected numerous followers, who were often confounded with the Albigenses and others, whose fate they shared. Their chief strongholds were, and still are, in the mountain tract of the Cottian Alps, southwest of Turin, where, since 1848, they (about 10,000) enjoy the same religious rights, and now also the same political rights, as the Roman Catholics of Italy. The design of the founder was to reform the clergy, and to preach the word of God freely to everyone in his native language; but his followers went far beyond the original plan. They made the Bible alone the rule of their faith, renounced entirely the doctrines, usages, and traditions of the existing church, and formed a separate religious society. They were, therefore, excommunicated as heretics, and for centuries suffered occasional persecution. Separate congregations found their way to various parts of Europe, and some of these became attached or amalgamated with other reformed sects. The spiritual teachers of the modern Waldenses are supplied from the academies of the Calvinistic churches. The Waldensian rites are limited to baptism and the Lord's supper, respecting which they adopt the notions of Calvin. Each congregation is superintended by a consistory composed of elders and deacons, under the presidency of the pastor, which maintains the strictest moral discipline, and adjusts small differences. From the time of their origin the Waldenses have been distinguished by their pure morals and their industry.

Waldersee (väl'der-sē), ALFRED, COUNT VON, a German general, born in 1832; died in 1904. He served in the Austrian and French wars of 1866 and 1870, became Moltke's chief assistant in 1881, and chief of staff of the German army on the resignation of Von Moltke. In 1900 he was made commander-in-chief of the allied forces in China.

Wales (wālz), a principality in the southwest of the island of Great Britain, which since Edward I gives the title of Prince of Wales to the heir-apparent of the British crown; area, 7446 square miles; pop. 2,032,193. As a whole it is very mountainous, particularly in the north, where Snowdon, the culminating point of South Britain, rises to the height of 3571 feet; and it is intersected by beautiful valleys, traversed by numerous streams, including among others the large river Severn. It is rich in minerals, particularly coal, iron, copper, lead, and zinc, and to these Wales owes its chief wealth. The coal trade is most extensive, and Cardiff (which see) is one of the largest coal ports in the world. Iron, steel, and copper works are also on a large scale. Besides the mineral industries, there are considerable woolen manufactures, especially of flannel, coarse cloth and hosiery. (See *England* and *Britain*.) The inhabitants are almost purely Celtic in race, being the descendants of the early Britons, who were able to maintain themselves here when the rest of the country was overrun by the Germanic invaders. Most of the upper class belong to the Church of England (disestablished in 1914), but the vast majority are Protestant Nonconformists, the most numerous bodies being the Congregationalists, the Calvinistic Methodists, and the Baptists.

Previous to the Roman occupation Wales appears to have been chiefly inhabited by three British tribes, called the Silures, Dimetæ, and Ordovices. During the later period of the Roman occupation the subject part of the island was divided into four provinces, of which one, including the country from the Dee to the Severn, was called Britannia Secunda. It was after the invasion of the Saxons that the country acquired a distinctive national character, as the refuge of the vanquished Britons who were gradually driven to the west. From this period till the final conquest of the country by Edward I there was little but a succession of petty wars between the

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rival chiefs or kings into which both countries during a great part of the Saxon period were divided, or the more systematic efforts of the larger monarchy to absorb the smaller. Among the greatest of the Welsh heroes of the early period was Cadwallon. After being defeated by Edwin of Deira, or Northumbria, and compelled to flee to Ireland, he returned and defeated the Saxons in numerous battles, but was at last defeated and slain by Oswald of Northumbria in 635. The last of the Welsh princes, Llewellyn, who revolted against Edward I, was defeated and slain by the Earl of Mortimer in 1284, and since that time the principality has been incorporated with England. There were, however, for a number of years, occasional insurrections, some with French assistance. In 1400 Owen Glendower, incensed by an encroachment by Lord Grey de Ruthyn, rose in arms and held his own for a considerable period, Henry IV taking the field against him in vain. In 1401 very severe rescriptive laws against the Welsh were passed and Sir Henry Percy (Hotspur), Justiciary of Chester, was put in command, but Owen held his own, Henry IV, who invaded the country in 1402, being driven back by extraordinary storms. Owen was recognized as Prince of Wales in 1402, and allied himself with Hotspur and others for a partition of the kingdom, but King Henry intercepted Hotspur in his march, defeating him near Shrewsbury. Owen continued to hold out until his death in 1415. Wales was incorporated with England, with English laws and liberties, in 1536; the lords marchers' surviving jurisdiction was abolished in 1689; and the Welsh judiciary was incorporated in the judicial system of England in 1831.

The native name of the Welsh language is Cymraeg, the speech of the Cymri (which see). The names Wales and Welsh are of Anglo-Saxon origin, from *wealas*, strangers, foreigners (plural of *wealh*). The Welsh language is, with the other Celtic languages, included in the Indo-European group. The alphabet contains thirteen simple and seven double consonants, and seven vowels, with numerous diphthongs and triphthongs. It is still spoken exclusively by about a quarter of a million of the inhabitants of the principality. The necessities of commerce are, however, gradually doing for the Welsh language what they have done for the Irish and Gaelic, and English is becoming more and more the language of everyday life in Wales. The earliest remains of Welsh literature are supposed to belong to the ninth century. There are a number of poetic pieces attributed to Taliessin, Aneurin, Merlin, and Llywarch Hen, bards supposed to have lived in the fifth century; but great and reasonable doubts have been thrown on the authenticity of these early productions, which, in their present form at least, are not believed to be earlier than the eleventh century. Subsequent to this time there were numerous poems written, many in praise of warriors, others dealing with love, or descriptive of nature.

Dafydd ap Gwilym (1293-1356) has frequently been called the Ovid of Wales. A welcome guest at every mansion in Wales, he traveled much throughout the land. As a poet of nature, few, if any, English writers equal him and none approached him before Wordsworth. He is familiar with every bird and flower, and his descriptions of natural objects are not the conventional ones of Chaucer, but indicate a profound and loving familiarity with nature's innate secrets. To the earlier poets of Wales we must ascribe the origin of the favorite romances of Arthur and his knights, which had long been floating as folklore, but were first put by them into literary shape. Geoffrey of Monmouth made these legends known to British writers, and within twenty years afterwards the legendary heroes of early Britain were household names throughout Europe. Among the Welsh bards of later date may be named Huw Morris (1622-1709) and Goronwy Owen (1772-80), the latter the author of *Cywydd y Farn* ('Day of Judgment'), which is regarded as the finest poem in the Welsh language. There are extant a number of prose tales or romances, the chief of which are contained in a collection known as the *Mabinogion*, which dates back to the era of the Arthur romances. All their literature existed in manuscript until 1546, when appeared the first Welsh book ever printed. Modern works in Welsh are largely confined to theology, history and biography, though there were many song writers in the nineteenth century, with some writers of literary essays and novels. Much has been done in the recent period in reëditing the old Welsh literature. The *Myvyrian Archaiology*, containing poems, historical and other medieval works, was published early in the nineteenth century, the *Mabinogion*, with translations in 1838, and the *Four Ancient Books of Wales*, containing the Book of Aneurin, the Book of Taliesin, the Black Book of Carmarthen, and the Red Book of Hergest, in 1868, and other Welsh texts at different dates.

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Wales, PRINCE OF, the title applied to the eldest son of the English sovereign since the period of the conquest of Wales by Edward I. After the fall of the last native Welsh princes, Llewellyn and David, in 1284, Edward is fabled to have presented the Welsh with a prince in his infant son Edward, born at Carnarvon Castle, but he was not really created Prince of Wales until 1301. Edward III made his son, the Black Prince, Prince of Wales in 1343, and from that time till the present the title has been continuously borne by the eldest son of the British monarch. Until the reign of Charles II the connection with Wales was maintained by the odd arrangement of providing a Welsh wet-nurse for the infant Prince of Wales. The title has usually been bestowed by patent and investiture, though in a few instances a simple declaration has sufficed to make the heir to the throne Prince of Wales. The eldest son of the sovereign inherits the title of Duke of Cornwall, which title was first bestowed in 1337, on Edward, the Black Prince. Edward III bore the title, before his accession to the throne, of Earl of Chester, and this title has since accompanied that of Prince of Wales. When a Prince of Wales dies before his father, his son, or his next younger brother, is given the title, being heir apparent, though this was not done in the case of Charles I until four years after the death of Prince Henry. The Prince of Wales also bears the Scotch titles of Great Steward of Scotland, Duke of Rothsay, Earl of Carrick, Baron of Renfrew and Lord of the Isles, and the Irish title of Earl of Dublin was created for him in 1849. The Prince of Wales has a separate household and obtains the larger part of the revenues of the Duchy of Cornwall, amounting approximately to $600,000, with an annuity of about $100,000. By a statute of the Order of the Garter in 1805, the Prince, when he receives his title, becomes a Knight of the Garter. The arms of the Prince are those of the sovereign, and he bears besides a badge composed of a plume of three white ostrich feathers encircled by an ancient coronet of a Prince of Wales, with the motto 'Ich Dien' ('I Serve').

Wales, WILLIAM, an English astronomer, born about 1734; died in 1798. He observed the transit of Venus at Hudson Bay in 1768, and accompanied Captain Cook in his second and third voyages. Chosen a Fellow of the Loyal Society in 1776; and published *General Observations Made at Hudson Bay.*

Walford (wal'furd), LUCY BETHIA, novelist, born near Edinburgh, Scotland, in 1845, daughter of John Colquhoun, author of *The Moor and the Loch.* She wrote *The Baby's Grandmother, A Stiffnecked Generation, The Matchmaker, The Intruder,* and other books.

Walfisch Bay (wal'fish), a British settlement and harbor of refuge in Southwest Africa, on the coast of Damaraland; area, with Penguin Island, about 450 sq. miles; pop. 1000. It was acquired by Great Britain in 1878, annexed to Cape Colony in 1884, and is governed by a resident magistrate from that colony.

Walhalla (wâl-hâl'la), a magnificent and sumptuously decorated Doric octostyle peripteral temple, on the Danube, near Ratisbon; built between 1830-42, as a national pantheon, consecrated to celebrated Germans of all walks of life. The idea of the erection is derived from the Walhalla or Valhalla, the ancient paradise of Odin and the Scandinavian deities. (See *Valhalla.*)

Walker (wa'ker). FRANCIS AMASA, political economist, was born at Boston, Massachusetts, July 2, 1840, son of AMASA WALKER (1779-1875), author of *Nature and Uses of Money* and *Science of Wealth.* He was graduated from Amherst College in 1860, became chief of the U. S. Bureau of Statistics in 1869, superintendent of the census in 1870 and 1880, commissioner of Indian affairs in 1871, professor of political economy at Yale in 1873, and president of the Massachusetts Institute of Technology in 1881. His works include *The Indian Question; Wages and the Wage Class; Money, Trade and Industry; Political Economy; Land and its Rent,* etc. He died January 5, 1897.

Walker, FREDERICK, an English painter, born at London in 1840; died in 1875. At an early age he began drawing, and after spending about eighteen months in an architect's office became a student at the Royal Academy (1858), and commenced designing for wood engravers. The illustrations he supplied from 1860-64 to the *Cornhill Magazine* and *Once a Week* are full of life, and rank high as specimens of this kind of draughtsmanship. Some of these drawings he reproduced in watercolor, in which medium he produced a number of exquisite pictures. In 1863 he exhibited his first oil painting, *The Lost Path,* at the Royal Academy, and was made an associate R.A. in 1871. His best works in oil are *The Bathers* and *By the Plough.* Originality, poetic feeling, graceful drawing and remarkable purity and range of color characterize his paintings.

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Walker, GEORGE, was born of English parents, in county Tyrone, Ireland, in the early part of the seventeenth century, and was killed at the battle of the Boyne in 1690. He studied theology at Glasgow University, and after taking orders obtained the living of the parish of Donoughmore. He was rescued from obscurity by the arrival of James II in Ulster (1689), which caused Walker to seek refuge in Londonderry; and in the memorable siege of that city he took the most prominent part both in word and deed. (See *Londonderry.*) After the siege Walker went to London, was presented with the bishopric of Derry and £5000 and parliament voted him its thanks. Instead of taking quiet possession of his bishopric he accompanied William III in his Irish campaign, and fell a victim to his courage.

Walker, JOHN, an English lexicographer, born in Middlesex in 1732; died in 1807. He published *A Rhyming Dictionary* and *Critical Dictionary and Expositor of the English Language,* which became very popular.

Walker, ROBERT J., statesman, was born at Northumberland, Pennsylvania, in 1801; died in 1869. He removed to Natchez in 1826, practiced law there, and was elected United States Senator by the Democratic party in 1835. He strongly supported the annexation of Texas to the United States, was appointed Secretary of the Treasury by President Polk in 1845, and made a report in favor of free trade which attracted much attention. He was appointed Governor of Kansas in 1857, but dissatisfaction with the policy of the government caused him to resign his governorship in 1858.

Walker, WILLIAM, filibuster, was born at Nashville, Tennessee, in 1824, and emigrated to California about 1850. In 1855 he led a party of adventurers to Nicaragua, took the side of one of the factions engaged in civil war, captured Granada, assumed the title of President of Nicaragua, and reëstablished slavery, which had been abolished. He was driven from power in 1857 and retired to New Orleans. In 1860 he led an expedition against Honduras and was captured and shot at Truxillo in September, 1860.

Walking Delegate, the name given an official of a trade union, whose duty is to visit places where members of the union are employed and ascertain if they are keeping the laws of the craft. When an unexpected strike has been ordered by the union directors it is his duty to notify the workmen to stop work at the place or places indicated.

Walking-Leaves and Walking-Sticks. See *Leaf-insects, Phasmidæ, Mimicry.*

Walkyrias. See *Valkyrias.*

Wallaby (wol'a-bi), a name common to several rather small-sized kangaroos of the genus *Halmaturus.*

Wallace (wol'las), ALFRED RUSSELL, naturalist, was born at Usk, Monmouthshire, England, Jan. 8, 1822, and was educated at Hertford Grammar-school. He spent many years in traveling, especially in South America and the Asiatic Islands, and the valuable material collected in these scientific explorations he embodied in *Travels on the Amazon and Rio Negro, The Malay Archipelago, Tropical Nature, The Geographical Distribution of Animals,* etc. His observation of animal life early led him on to the track of natural selection, and before Darwin gave his famous work to the world he had published his *Speculations on the Origin of Species.* His share in establishing the theory was acknowledged by Darwin. But while Darwin, in his later editions of the *Origin of Species,* somewhat modified his original conclusions, Wallace, in his recent work, *Darwinism, an Exposition of the Theory of Natural Selection* (1889), strongly insists upon the complete controlling power of these primary laws and conditions. Wallace, however, differs from Darwin on the subject of the intellectual, moral, and spiritual nature of man. He contends that the higher faculties have been developed not under the law of natural selection, but under a higher law, which has come in imperceptibly; and that the Darwinian theory supports this view. Among his later works are *Miracles and Modern Spiritualism* (in which he declares a full belief), *Island Life, Land Nationalization,* etc. He died November 7, 1913.

Wallace, LEWIS, soldier and author, born at Brookville, Indiana, April 10, 1827. He served with distinction in the Mexican and Civil wars; was appointed Governor of New Mexico, 1880; and Minister to Turkey, 1881-85. He practiced law and wrote very extensively. Among his works are *The Fair God; Ben Hur, A Tale of the Christ,* etc. The latter has had a greater circulation than any work since *Uncle Tom's Cabin.* He died February 15, 1905.—His wife, SUSAN E. WALLACE, wrote *The Storied Sea, Along the Bosporus,* and other works.

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Wallace, Sir William, the hero of Scottish independence, is said to have been the younger son of Sir Malcolm Wallace of Elderslie and Auchinbothie, by Margaret, daughter of Sir Reynold Crawford, sheriff of Ayr. He was probably born about 1270. For the most detailed particulars we possess about this famous Scottish character we are almost entirely dependent on Blind Harry (see *Harry the Minstrel*); but the narratives cannot bear the scrutiny of the critical historian. Contemporary Scottish records do not exist, while the English chroniclers of the period were but imperfectly informed and prejudiced. Wallace is described as a man of herculean proportions and strength, and it is certain that he possessed in a high degree the qualifications of a commander. He is represented as having been for some years engaged in a partisan war against the English before what is represented by Blind Harry as the turning-point in his career took place, the slaughter of Haselrig in revenge for the murder of his wife, and in pursuance of his vow of eternal vengeance against the invaders of his country. Henceforth he continued in open resistance to the English, and having collected a considerable force was besieging the castle of Dundee when he heard that Surrey and Cressingham were advancing upon Stirling with a large army. He met them in the vicinity of that town, and, thanks to his ingenious military tactics, gained a complete victory (1297). After this Wallace appears with the title of Guardian of the Kingdom, which was temporarily cleared of the English, and is found conducting a series of organized raids into England. In 1298 Edward I entered Scotland with an army estimated at nearly 90,000 men. Wallace retired before him, wasting the country, but was at length overtaken at Falkirk, compelled to fight, and after a gallant resistance his army was routed. He succeeded in escaping, and little is known of his movements henceforth. He was excluded from the peace granted by Edward to the Scottish council of regency in 1304, and every effort was made to secure his apprehension. It was effected through Alexander de Monteith, governor of Dumbarton Castle. Wallace was conveyed to London, and after a mock trial found guilty of treason and rebellion, and executed on August 23, 1305. A memorial to Wallace has been placed on the summit of Abbey Craig, near Stirling, in the form of a Scotch baronial tower, surmounted by an architectural crown, and having a height of 220 feet. It serves the purpose of a Scottish Walhalla, and busts of eminent Scotchmen are from time to time added.

Wallace, William Vincent, musical composer, was born of Scotch parents, at Waterford, England, in 1814; died in France in 1865. His father, a bandmaster in the army, taught him to play on the usual military instruments, and procured him teachers of the violin, pianoforte, and guitar. He spent some years in Australia, and made an extensive concert tour in the Australian colonies, in India, and in America. In 1845 he went to London, and devoted himself to composition. His first opera, *Maritana*, was produced at Drury Lane, in 1846, and secured him at once a reputation. *Lurline* and the *Amber Witch* are his other chief operatic compositions. For the pianoforte he wrote numerous airs of great sweetness, which are very popular.

Wallachia. See *Roumania*.

Wallack (wal'lak), James William, an American actor, born in London in 1795; died in 1864. He made his first appearance in the United States at the Park Theater, New York, in 1818, opened the National Theater in 1825, Wallack's Lyceum in 1852, and Wallack's Theater in 1861.— His son, Lester John, born in New York in 1820, conducted Wallack's Theater with much success for many years. He wrote the plays of *The Veteran* and *Rosedale*, also *Memoirs of Fifty Years*. He died September 6, 1888.

Wallaroo (wol'a-rō), the native Australian name given to two species of kangaroos, the *Macrōpus antipolinus*, the red wallaroo, and *M. robustus*, the black wallaroo, found in New South Wales.

Wallaroo, a seaport town in South Australia, on the Spencer Gulf, 91 miles north of Adelaide. The Wallaroo and other copper mines are in the neighborhood, and the largest smelting works in the colony are carried on at Wallaroo Bay. Pop. 2920.

Walla Walla (wol'lȧ wol'lȧ), a city, capital of a county of the same name in Washington, on the Walla Walla River. It is in a rich grain, fruit and live-stock region with an extensive trade. It has a large foundry, agricultural machine works, flour mills, etc. Here are several collegiate institutions, a state penitentiary, and a military post. Pop. 20,963.

Wallenstein (vȧl'en-stīn), Albrecht Wenzel Eusе-

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BIUS, VON, Duke of Friedland, a famous leader in the Thirty Years' war, was born on the paternal estate of Hermanic, Bohemia, in 1583; assassinated at Eger in 1634. Both his father and mother belonged to the Bohemian evangelical church, but shortly after their early death Wallenstein went over to the Roman Catholic faith. He finished his studies at the Universities of Bologna and Padua, and traveled in Italy, Germany, France, Spain, England and the Netherlands. He took military service in Hungary, and returned to Bohemia at the peace of 1606 with the rank of captain. When the Thirty Years' war broke out in Bohemia (1618) he joined the imperial forces against his native country. His estates, valued at 30 million florins, he was allowed to form into the territory of Friedland, and in 1624 he was created Duke of Friedland. He raised a large army to assist the emperor against the Lower Saxon League; defeated Count Mansfeld at Dessau (April, 1626), and compelled Bethlen Gabor to conclude a truce; conquered Silesia, and bought from the emperor, partly with military services, partly with plunder, the duchy of Sangan and other extensive estates. In September, 1630, owing to the jealousy of the nobles and the license of his followers, he was deprived of his command, and retired to his duchy of Friedland until the emperor was compelled to seek his aid against Gustavus Adolphus. Wallenstein now obtained almost absolute power, and did not fail to abuse it. His behavior henceforth leaves no doubt that the emperor's interests were second to his own, and that he would not have hesitated to join the emperor's enemies to secure his own independence and the crown of Bohemia. After some partial successes he encountered the King of Sweden at Lützen, November 16, 1632, in which battle Wallenstein was defeated and Gustavus killed. Wallenstein had unsuccessfully treated on his own account with the Swedish king, and he now secretly reopened negotiations with France and the German princes, occasionally taking the field to display his military power. The court at Vienna was well aware of his crafty diplomacy, but the emperor was not strong enough to remove him, and had recourse to assassination. This was done at Eger, where Wallenstein had retreated for safety, and where he was killed by Colonel Gordon, commandant of the fortress, and his fellow officers Butler, Leslie, and Devereux. Wallenstein is the subject of and gives the title to one of Schiller's best dramatic poems.

Waller (wol'er), EDMUND, an English poet, born at Coleshill, Hertfordshire, in 1605; died in 1687. He was early left an orphan with a considerable estate, and was educated at Eton and King's College, Cambridge. His mother was a sister of John Hampden, and a royalist, but all the rest of his relatives were against the court. It is stated that Waller wrote poetry at eighteen, but his first collection of poems did not appear until 1645. As an elegant amatory and panegyrical poet, a brilliant talker and wit, he was a great favorite at court, in parliament, and in society. But his political conduct is not honorable. At heart he probably remained true to royalty, but he sang the praises of the Lord Protector as well as those of the Charleses. He was sent as the commissioner from parliament to the king after Edgehill. Shortly after he plotted in favor of the king, and when detected turned informer. His brother-in-law, Tomkins, and the latter's friend, Chaloner, suffered death, while Waller by his judicious bribery got off with banishment and a fine of £10,000. After nearly ten years of exile in Paris, Cromwell allowed Waller to return in 1653, and he took his usual place in society and parliament, and was afterwards welcome at the courts of Charles II and James II.

Wallflower (wal'flou-er), the common name of the species of plants belonging to the genus *Cheiranthus*, nat. order Cruciferæ. They are biennial or perennial herbs or undershrubs. Many of them exhale a delicious odor, and are great favorites in gardens. The best known is the *C. Cheiri*, or common wallflower, which, in its wild state, grows on old walls and stony places. In the cultivated plant the flowers are of more varied and brilliant colors, and attain a much larger size than in the wild plant, the flowers of which are always yellow.

Wallingford (wol'ing-fêrd), a borough of New Haven Co., Connecticut, on the Quinepiac River and two railroads, 12 miles N. N. E. of New Haven. It has manufactures of silver and plated ware, insulated wire and fireworks. Pop. 11,155.

Wallis (wol'is), JOHN, an English mathematician, born in 1616; died in 1703. Educated for the church at Emanuel College, Cambridge, he took orders in 1640, and in 1663 obtained a living in London. He was one of the secretaries to the assembly of divines at Westminster; became Savilian professor of geometry at Oxford in 1649, and D.D.

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in 1654. Charles II, for services rendered to the royal cause, made him one of the royal chaplains, and in 1661 he was one of the divines appointed to revise the *Book of Common Prayer*. He was one of the earliest and most useful members of the Royal Society, founded in 1663. He was the author of many mathematical, theological, and controversial works and papers, the most important of which are his *Arithmetic of the Infinities* and his *Mechanics*.

Walloons (wa-lönz'), or WALLONS', lineal descendants of the old Gallic Belgæ, who occupy the Belgian provinces of Hainault, Liège, Namur, and part of Southern Brabant and Western Luxembourg. They are superior in physique to their Flemish compatriots, and a large proportion of them have black hair and eyes. In 1905 there were resident in Belgium 3,600,000 Flemish, and 3,300,000 Walloons. Their language, also called Walloon, is a French patois retaining numerous Gallic words, but it somewhat varies in the different provinces.

Wall Paper, paper used to cover the walls of dwellings, ornamented with a pattern printed in colors. It has come into very general use, and many of the more costly wall papers are highly artistic and ornamental.

Wallsend (wąlz'end), a town of Northumberland, on the Tyne, 4 miles N. E. of Newcastle. It is named from being situated at the eastern extremity of the Roman Wall, and was formerly famous for its coal. Metal and chemical works form the chief industries. Pop. 41,464.

Wall Street, the financial center of New York city, in which the various exchanges and the largest banking institutions are situated, and stocks and bonds are dealt in to a vast extent. Its control over finance has spread until now it affects the whole country and is a rival of the great financial centers of Europe.

Walnut (wąl'nut), the common name of species of trees and their fruit of the genus *Juglans*, nat. order *Juglandaceæ*. The best known are the common European species of walnut tree (*J. regia*), a native of several Eastern countries and the black walnut (*J. nigra*), found in most parts of the United States. The latter often grows to large size, the trunk in favorable situations attaining a diameter of 6 to 7 feet. The European species is a large, handsome tree with strong spreading branches. The timber of the walnut is of great value, is very durable, takes a fine polish, and is a beautiful furniture wood. It is also employed for turning and fancy articles, and especially for gun-stocks, being light and at the same time hard and fine grained. The ripe fruit is one of the best of nuts, and forms a favorite item of dessert. It yields by expression a bland fixed oil, which, under the names of *walnut-oil* and *nut-oil*, is used by painters, and in the countries in which it is produced is a common article of diet. In copper-plate printing it is employed to produce a fine impression, either in black or colors. By boiling the husks

Walnut (*Juglans regia*).

when beginning to decay, and the bark of the roots, a substantial dark-brown color is obtained, which is used by dyers for woolens, and also by cabinet-makers to stain other species of wood in imitation of walnut. The fruit, in a green state, before the shell hardens, is much used for pickling. The American species yields a wood preferable to the European walnut for furniture and carpentry purposes, its abundant use having caused a scarcity of this handsome and valuable lumber. Its nuts are inferior, the shell being much harder, though the kernel is very oily. The butternut (*J. cathartica*) is another noteworthy variety. See *Butternut*.

Walpole (wol'pōl), HORACE, Earl of Orford, third son of Sir Robert Walpole, born in 1717; died in 1797. He was educated at Eton, and King's College, Cambridge, on leaving which he traveled two years on the continent in company with Gray, the poet. Returning in 1741 he entered the House of Commons, and he sat for various constituencies up to 1768. He always took

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a lively but superficial interest in politics, inclining sentimentally to extreme opinions. In 1747 he purchased Strawberry Hill, near London, where he erected a Gothic villa, laid out the grounds with minute ingenuity, and made it a principal business of his life to adorn and furnish it with objects of curiosity and antiquarian interest. His maintenance was provided for by some sinecure appointments, obtained through his father's influence. To his antiquarian taste he added authorship, first in verse and afterwards more extensively in prose, and in 1757 he established a private printing press at Strawberry Hill, at which he printed not only his own works but those of others. In 1791 he succeeded his nephew in the peerage. He never took his seat in the House of Lords, and appears to have avoided using his title. Walpole's works are numerous; but his fame as a writer rests on his *Letters* and *Memoirs*. The former are held to be unsurpassed in the English language, and both are highly interesting and valuable as a storehouse of the more evanescent traits of contemporary history. His romance, *The Castle of Otranto*, is also well known. Walpole's manners were affected; he was fastidiously aristocratic, sensitive to criticism, and eager for applause; but under his vanity and frivolity there existed a substratum of good sense and sound judgment.

Walpole, Sir Robert, Earl of Orford, statesman, was born at Houghton, England, in 1676; and died in 1745. He was educated at Eton, and at King's College, Cambridge; succeeded to the paternal estate in 1700, and entered parliament as member for Castle Rising. In 1702 he was elected for King's Lynn, became an active member of the Whig party, and soon distinguished himself by his business capacity, and by his easy, plausible, and dispassionate debates. He was secretary of war and leader in the Commons in 1708, paymaster of the forces in 1714 and 1720, and first lord of the treasury and chancellor of the exchequer in 1715, and again in 1721. From the latter date until 1742 he held without interruption the highest office in the state, that of prime minister. During his long administration the Hanoverian succession, to which he was zealously attached, became firmly established, a result to which his prudence and political sagacity largely contributed. He promoted by an enlightened policy the commercial prosperity of the nation, and relieved the weight of taxation by many improvements in the tariff. In 1724 he was made a Knight of the Bath, in 1726 a Knight of the Garter, and on February 9, 1742, two days before his resignation, he was created Earl of Orford. In an age famous for venality

Sir Robert Walpole.

and lax morals he was the least corrupted, the soberest, and the hardest working of the leaders of both factions. An able monograph on Walpole has been published by John Morley.

Walpurga (val-pör'ga), Walburga, or Walpurgis, a female saint, born in England early in the eighth century; died in 779. She was for many years a nun in a Dorsetshire convent. As a niece of St. Boniface and sister of St. Willibald, first bishop of Eichstädt, Bavaria (741-786), she was induced to proceed to Germany to found convents, and in 754 she became abbess of Heidenheim, a convent within her brother's bishopric. She died at the latter place, but was buried at Eichstädt, where her shrine was visited by many pilgrims and was the scene of many miracles. The eve of May 1, associated with some of the most popular witch superstitions of Germany, is called *Walpurgis-night*, but her feast falls properly on the 25th of February.

Walrus (wol'rus), a marine carnivorus mammal, the single species constituting a genus *Trichecus*, as well as the family Trichecidæ, and belonging, with its allies, the seals, to the pinnigrade section of the order Carnivora. The walrus, which is also known as the morse, sea-horse and sea-cow, has a general resemblance to the seals, but is especially remarkable from the upper canine teeth being enormously developed in the adults, constituting two

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large pointed tusks directed downwards and slightly outwards, and measuring usually 12 to 15 inches in length, sometimes even 2 feet and more. There are no external ears. The animal exceeds the largest ox in size, attaining a length of 20 feet. It is monogamous, and seldom produces more than one young at

Pacific Walrus (*Odobænus obesus*).

a birth; gregarious but shy, and very fierce when attacked. It inhabits the high northern latitudes, where it is hunted by whalers for its blubber, which yields excellent oil; for its skin, which is made into a durable leather; and for its tusks. Its favorite food consists of crustaceans.

Walsall (wol'sąl), a parliamentary and municipal borough of England, in the county of Stafford, 8 miles N. N. W. of Birmingham. The present town is almost entirely modern. Extensive coal, iron, and limestone deposits in the immediate vicinity, and ample canal and railway communication with leading trade centers, have made an important manufacturing town of Walsall. Brass and iron foundries are numerous and on a large scale; and for saddlers' and carriage-builders' ironmongery, tools, locks, and keys, etc., Walsall has long been famous. Pop. 92,130.

Walsh, Robert, author, born at Baltimore, Maryland, in 1784; died in 1859. In 1837 he removed to Paris, and was U. S. consul there 1845–52. He edited the *American Review of History and Politics*, the first American quarterly, and was the author of various works of literature, political in character. He conducted the *American Register*, the *National Gazette*, and the *Museum of Foreign Literature and Science*, and edited *Didactics: Social, Literary and Political*.

Walsh, William Shepard, journalist, born at Paris in 1854, son of the preceding. He wrote much for periodicals, became editor in 1886 of *Lippincott's Magazine*, and published *Faust: The Legend and the Poem*, *Paradoxes of a Philistine*, *Handy Book of Literary Curiosities*, historical and scientific books for the young, etc.— His brother, Henry Collins Walsh (born 1863), also a journalist, wrote *By the Potomac and other Poems*, *The Last Cruise of the Miranda* (a record of an Arctic voyage), etc.

Walsingham (wol'sing-am), Sir Francis, an English statesman of the reign of Elizabeth, born of good family about 1536; died in 1590. After studying at King's College, Cambridge, he traveled on the continent for some time, and acquired a good knowledge of foreign languages and politics. He was introduced by Cecil, Lord Burleigh, to public service, and was employed in embassies to France, the Netherlands, and Scotland. He also sat in the House of Commons for various constituencies, and occupied important public offices. His sagacity and discretion caused him to be much employed, often against his own desire, in the intrigues of Elizabeth, especially against Mary Queen of Scots. The unraveling of the Babington plot was intrusted to Walsingham, and he was also one of the commissioners who tried Queen Mary.

Walter (wąl'ter), John, an English journalist, born in 1739; died in 1812. He founded the London *Times*, the greatest of British journals, in 1788. He was succeeded by two others of the same name. The last died in 1894 and was succeeded by his nephew, Arthur.

Walter, Thomas U., architect, born at Philadelphia in 1804; died in 1887. He was the architect of Girard College, in Philadelphia, a magnificent Grecian structure, and in 1851 was made architect of the United States Capitol extension. In addition to this work he built several of the department buildings at Washington. He was for many years professor of architecture in the Franklin Institute, Philadelphia.

Waltham (wol'tham), a city of Middlesex Co., on the Charles River, Massachusetts, 9 miles west of Boston. The river supplies abundant water-power to its factories of watches, watch-tools, and cottons. The Waltham

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machine-made watches are known throughout the world. There are various other industries, including knit goods, automobiles, bleachery and dye works. Pop. 27,834.

Waltham Abbey, a market town of England, in the county of Essex, 12 miles north by

Waltham Cross.

east of London, on the left bank of the Lea. It derives its name from an old abbey founded by King Harold in 1060; and is now chiefly known for its government gunpowder and guncotton factories. In the hamlet of West Waltham, or Waltham Cross, about a mile from Waltham Abbey, is a famous cross erected 1291-94 by Edward I. Pop. of district 6796.

Walther von der Vogelweide (fō'gl-vī-dē), one of the most eminent old German lyric poets of the class of *Minnesingers*, was born about 1170; died at Würzburg about 1230. His earliest patrons were Duke Leopold VI of Austria and his son Frederick. Subsequently he visited, for shorter and longer periods, the courts of most German princes, who were in favor of an imperial as against a papal policy and who could appreciate his distinguished muse. The emperor Frederick II provided him with a small estate near Würzburg, where he seems to have always retired when disgusted with traveling, the courts, and intrigues, and there he died. He was a politician and reformer as well as a poet, and his exquisite and manly verses breathe a liberalism far in advance of his times; while the subjects of his favorite love songs are women true and noble.

Walton (wal'tun), IZAAK, the author of the famous *Compleat Angler*, was born at Stafford in 1593; died at Winchester in 1683. For a number of years he carried on successfully in London some branches of the drapery trade, but retired at the age of fifty, and devoted his remaining forty years to a life of cultured ease and pleasure. In 1626 he married a relative of Archbishop Cranmer, and about 1646 a half-sister of Bishop Ken. Through these matrimonial alliances he became friendly and intimate with many of the distinguished ecclesiastics of his time, and wrote the biographical memoirs of some of them. His first edition of the *Compleat Angler* appeared in 1653. It is to his exquisite delineations of rural scenery, his genuine love for the Creator and His works, the ease and unaffected humor of the dialogue, and the delightful simplicity and purity of the style, that this notable work owes its charm.

Waltz (waltz), a dance of Bohemian origin, executed with a rapid wheeling motion, the gentleman having his arm round his partner's waist. The music is written in triple time in crotchets or quavers, and consists of eight or sixteen bar phrases. Several of these phrases are now usually united to prevent monotony. The *valse à deux temps* is a form of waltz in which two steps are made to each bar of three beats. *Classical waltzes* are composi-

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tions in waltz form not intended for dance tunes.

Wampum (wąm'pum), the Indian name for shell beads, used by the United States tribes for ornament and as money, or a medium of commerce. They were often fastened together into a broad belt, called by them Wampumpaque, or Wampeaque. They were shaped by them out of seashells, cut into round pieces, but the colonists soon entered into this enterprise and quickly reduced the value of wampum by producing an oversupply.

Wanamaker (wa-na-mā'ker), JOHN, merchant, was born in Philadelphia, Pennsylvania, July 11, 1838. He engaged in the mercantile business in 1861, displayed great ability and enterprise, and in 1876 opened the first department store in the United States. This, started in Philadelphia, has a counterpart in New York, both of them very large and prosperous. In 1889-93 he was postmaster-general, and has taken an active part in politics from the reform side, also in Sunday-school work, the Bethany Sunday School, Philadelphia, founded by him, becoming one of the largest in the country.

Wandering Jew, the hero of a medieval legend, which deals with a Jew who cannot die, but is condemned to wander until the day of judgment in punishment for an insult offered to Christ, when on his way to the place of crucifixion. This legend is not of ancient origin, nor is it widespread. No trace of it is found in the literature of the early middle ages, and its popularity has been chiefly confined to a few countries, as Germany, France, Scandinavia and the Netherlands. The legend takes several forms, and has its analogues in the story of Cain, whose curse presents some similarity, and the Arab story of Samiri, the maker of the Golden Calf, who became a similar homeless wanderer. The Wandering Jew appears to make his first appearance in an Italian legend, which may be of great antiquity. This tells how a Jew named Malchus struck Jesus with an iron glove. Since then he has lived underground, doomed to turn endlessly around a pillar until the day of judgment. We first read of the historic Wandering Jew in the *Historia Major* of Matthew Paris (completed in 1259). His version is that an Armenian bishop visited England in 1228, and among the wonders of his country told of a Jew named Cartaphilus, then alive and well known to him, yet who had been a doorkeeper in the palace of Pilate in the time of Christ and had struck him while being led to the crucifixion, using the words, 'Go, Jesus: go on faster.' Jesus replied, 'I go, but thou shalt wait till I return.' The story goes on to state that Cartaphilus was baptized by Ananias with the name of Joseph and settled in Armenia, and had often eaten at the bishop's table. He was thirty years old when he insulted Christ, and whenever he reached the age of one hundred he fell into a faint and recovered to find himself again thirty years of age. The bishop's brother afterwards visited England, and some of the monks with him confirmed the story. It has been suggested that the name Cartaphilus (Gr., 'very dear') may have arisen from the disciple 'whom Jesus loved,' and of whom he said to Peter. 'If I will that he tarry till I come, what is that to thee?' (John xxi, 22). This saying may have been gradually transformed in its significance into that of the legendary wanderer. As for the Armenian origin of the story, a questionable point is the fact, that there exists no trace of such a story in Armenia or anywhere in the East.

Coming down to a date, three hundred years later, the story crops up again in a new development. Paul von Eitzen, bishop of Sleswick, is said to have seen the Jew at Hamburg in 1547, listening to his sermon. He was a tall, ragged, barefoot, gaunt wanderer, with long hair falling over his shoulders. His name had now become Ahasuerus, and his occupation at the time of Christ that of a shoemaker. He could talk in the language of every country, was never seen to laugh, and rebuked with the greatest severity all blasphemies against the name of Christ. This story became widely current during the succeeding period, and from this time forward we meet with many precise versions and variations.

One of the most celebrated appearances of the Jew was at Brussels in 1640, where he was seen and talked with by two reputable citizens. His name now becomes Isaac Laquedom, which Böttcher thinks is possibly a corruption, by a man of small learning, from the Hebrew *la-kĕdem* ('the former world'). These versions made their way into other countries, and their substance appears in a poem in Percy's *Reliques*. The name Laquedom is used in a beautiful French *complainte* on the subject. Still another name has been given the Jew, that of Buttadeus, and various other appearances are on record at Beauvais, Leipzig, Lübeck, Moscow, Madrid and Hull. The latter record is in a tract of 1769, in which four min-

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isters of Hull, Yorkshire, tell how 'some time since,' the Jew visited Hull and was locked up, but the prison doors flew open before one condemned to have no resting place. The *Turkish Spy*, writing from Paris in 1644, gravely tells of a conversation with him, now as Michob Ader, in several languages, including a five or six hour talk in Arabic.

In this talk the Jew 'the Younger Brother of Time,' told his listener that there was scarcely a true history in existence. When asked about what had become of the lost Ten Tribes of Israel, he was unable to give any satisfactory account of them. Such are the various notions which have arisen concerning this curious story. The conception involved is one that has been connected with other characters and incidents, like that of Cain fleeing with the brand of murder on him, the Wild Huntsman of German legend, and the famous story of the Flying Dutchman, so weirdly treated by Coleridge. The Wandering Jew has found a place more than once in literature, as in Eugene Sue's novel under that title, and the theme presented itself favorably to Goethe, but was abandoned for that of Faust.

Wanderoo, Wanderu (wan'der-ō; *Macacus silenus*), a monkey of southern Hindustan, especially near the Malabar coast. They are long, slender, black animals, notable for the large mane or ruff, and beard, which stand out like a gray or white frame to the black face, and give it a very peculiar aspect.

Wandsworth (wons'worth), a London suburban parliamentary borough, created in 1885. Pop. 311,402. Wandsworth proper is situated at the confluence of the Wandle with the Thames, immediately to the s. w. of Battersea, and is an important center of industry.

Wantage (won'tāj), a market town of England, Berkshire, on a small tributary of the Thames, situated in the fertile vale of the White Horse. Pop. 3628.

Wapentake (wā'pen-tāk, wop'n-tāk), the name formerly given in some of the northern shires of England, and still given in Yorkshire, to a territorial division of the county, corresponding to the *hundreds* of the southern counties.

Wapiti (wop'i-ti), a species of deer, the North American stag (*Cervus Canadensis*), bears considerable resemblance to the European red deer, though it is larger and of a stronger make, its antlers also being larger. It is found in Canada and the northern parts of the United States from the Atlantic to the Pacific. Its flesh is not much prized, being coarse and dry, but its hide is made into an excellent kind of leather.

Wapping (wop'ing), a district of East London, in Middlesex, on the north bank of the Thames, inhabited chiefly by persons employed in the shipping of the port of London. Here are the London Docks, St. Catherine's Docks, etc., and the stupendous warehouses belonging to the custom-house, etc. See *London*.

War (war), a contest between nations or countries (*international war*), or between parties in the same country (*civil war*), carried on by force of arms, usually arising in the first case from disputes about territorial possessions and frontiers, unjust dealings with the subjects of one country by another, questions of race and sentiment, jealousy of military prestige, or mere lust of conquest, rarely nowadays from the whim of a despot. In the case of civil war it arises from the claims of rival contenders for supreme power in the state, or for the establishment of some important point connected with civil or religious liberty. In all cases the aim of each contending party is to overthrow or weaken the enemy by the defeat or dispersion of his army or navy, the occupation of important parts of his country, such as the capital or principal administrative and commercial centers, or the ruin of his commerce, thus cutting off his sources of recuperation in men, money, and material. International or public war is always understood to be authorized by the monarch or sovereign power of the nation; when it is carried into the territories of a hitherto friendly power it is called an *oppressive* or *offensive war*, and when carried on to resist such aggression it is called *defensive*. Previous to the outbreak of hostilities between countries, the power taking the initiatory step issues a *declaration of war*, which now usually takes the form of an explanatory manifesto addressed to neutral governments. During the progress of the struggle certain *laws, usages*, or *rights of war* have come to be generally recognized; such laws permitting the destruction or capture of armed enemies, the destruction of property likely to be serviceable to them, the stoppage of all their channels of traffic, and the appropriation of everything in an enemy's country necessary for the support and subsistence of the invading army. On the other hand

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though an enemy may be starved into surrender, wounding, except in battle, mutilation, and all cruel and wanton devastation, are contrary to the usages of war, as are also bombarding an unprotected town, the use of poison in any way, and torture to extort information from an enemy; and generally the tendency in all laws and usages of war is becoming gradually more favorable to the cause of humanity at large. These principles of warfare, it should be stated, refer to warlike conflicts as now conducted. As conducted in former, less civilized times, no such rules existed and war was carried on with little regard to mercy or morality. See also *International Law.*

War, Peasants'. See *Peasants' war.*

Warbeck (wär'bek), or Osbec, Perkin, the son of a Flemish Jew, was set up by Margaret of York, dowager-duchess of Burgundy, as a pretender to the crown of England against Henry VII. For this purpose she claimed to recognize him as her nephew, Richard Plantagenet, duke of York, the younger of the two princes who were murdered in the Tower by Richard III. He was patronized by France and Scotland, married a kinswoman of the Scottish king, James IV, made several fruitless invasions of England and Ireland, was taken prisoner after an attempt on Cornwall (Oct., 1497), and confined to the Tower, where, his plotting being continued, he was executed (November, 1499).

Warblers (wär'blerz; Sylviadæ), the name applied to a family or dentirostral insessorial birds, generally small, sprightly, very shy, and remarkable for the clearness, sweetness, and flexibility of their song. Insects form their food, and most of them are migratory. The typical warblers belong to the genus *Sylvia* (which see).

Warburton (wär'bèr-tun), William, an English prelate, was born at Newark-upon-the-Trent in 1698; died at Gloucester in 1779. He was brought up to the law, but not finding this profession to his taste he relinquished it, and in 1723 took deacon's orders in the church In 1727 he began to distinguish himself as a writer by his inquiry into the *Causes of Prodigies and Miracles.* This led to his being presented to the rectory of Brand Broughton, in Lincolnshire, where he remained many years, composing here most of those works which contributed to the establishment of his fame. In 1736 appeared his first important work, the *Alliance Between Church and State,* etc., but his great work is the *Divine Legation of Moses.* It was assailed in many quarters, and Warburton carried on the controversy with ability and intemperate vigor. A defense of Pope's *Essay on Man* secured him the friendship of the poet. By the death of Ralph Allen (which see), Warburton succeeded to the splendid seat of Prior Park, in Gloucestershire. He was appointed, in 1746, preacher to the society of Lincoln's Inn, and from at time his advancement was rapid, until he became the bishop of Gloucester in 1759.

Ward (ward), Artemas, a Revolutionary general, born at Shrewsbury, Massachusetts, in 1727; died in 1800. He served in the French and Indian war under Abercrombie. At the siege of Boston, in 1775, he became second in command under Washington. He resigned in April, 1776, and was a member of Congress from 1791 to 1795.

Ward, Artemus. See *Browne, C. F.*

Ward, Edward Mathew, an English painter, born at London in 1816; died at Windsor in 1879. In 1835 he joined the classes at the Royal Academy. The following year he went to Italy, where he studied fresco painting under Cornelius. He took part in the competition, opened in 1843, for decorating the House of Parliament, his design being illustrative of events in the history of Boadicea. Eight of his designs were finally accepted, and executed by him in the corridor of the House of Commons in 1853. For his subjects he generally chose interesting historical episodes and popular characters; hence, many of his paintings have been largely reproduced by the engraver. *Dr. Johnson in Lord Chesterfield's Ante-room,* and the *Royal Family of France in the Temple,* are considered his best works.

Ward, Mrs. Herbert D., Elizabeth Stuart Phelps, American author, born in Boston in 1844; died in 1911. She took an active interest in temperance and other reform movements. Her works include *Gates Ajar, A Singular Life, The Man in the Case, Story of Jesus Christ.*

Ward, Herbert Dickinson, author, born at Waltham, Massachusetts, in 1861. He married Elizabeth Stuart Phelps (which see) in 1888. He became an editorial writer for daily and monthly publications, and wrote *The New Senator at Andover, The Master of the Magicians, The Captain of the Kittiwink. The Burglar Who Moved Para-*

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dise, The Light of the World, Love Letters of an American Girl, etc.

Ward, Mrs. Humphry (Mary Augusta Arnold), was born at Hobart, Tasmania, June 11, 1851, a granddaughter of Dr. Arnold of Rugby. Her father, Thomas Arnold, was an author of some reputation. She married T. Humphry Ward, editor of *Men of the Time, The English Poets*, etc. As a novelist she is known under her husband's name. She gained a wide popularity in 1888 by her novel of *Robert Elsmere*, which had a phenomenal success. Other works from her pen are *David Grieve, Marcella, Sir George Tressady, Lady Rose's Daughter, The Case of Richard Meynell*, and a number of others, all of considerable popularity.

Ward, James, a British painter, born in London in 1769; died at Cheshunt in 1859. He early became eminent as an engraver, and only took to painting when arrived at middle age. His exquisite delineation of animals speedily secured him fame, and he was extensively patronized by George III.

Ward, John Quincy Adams, sculptor, born at Urbana, Ohio, in 1830; died May 2, 1910. After studying medicine for a time he became a sculptor and won the reputation of being one of the ablest that this country had produced. Among his works are the statues of *Shakespeare*, Central Park, New York; of *General Thomas*, at Washington, D. C., and of *General Washington* at Newburyport. He also produced *The Escaped Slave, The Indian Hunter, The Good Samaritan*, etc. He became a member of the National Academy of Design in 1863, and its president in 1872.

Ward, Lester Frank, geologist and sociologist, born at Joliet, Illinois, in 1841. He was graduated at Columbian College, Washington, D. C., in 1869, served as assistant geologist in the United States Geological Survey 1881-88, and afterwards as geologist and paleontologist. Among his many works are: *Dynamic Sociology, Geological Distribution of Fossil Plants, Principles of Sociology, Pure Sociology, Applied Sociology*, etc. He died April 18, 1913.

Ware (wâr), a town of Hampshire Co., Massachusetts, on Ware River, 27 miles E. N. E. of Springfield. It has manufactures of cottons and woolens, boots and shoes, hosiery, paper, etc. Pop. 8774.

Ware (wâr), William, author, born at Hingham, Massachusetts, in 1797; died in 1852. He became a church pastor at New York and elsewhere, and for a time edited the *Christian Examiner*. His *Letters from Palmyra*, in the *Knickerbocker Magazine*, were published in 1856, under the name of *Zenobia*, which was followed by *Aurelian* and *Probus*, classical romances, which brought him a high reputation. Other works were *The Works and Genius of Washington Allston*, and *Sketches on European Capitals*.

War Indemnity, the sum of money exacted from a defeated country by its victorious antagonist. This money payment replaces the spoils of war of former history, and was first adopted within the past century, the highest indemnity ever exacted being the $1,000,000,000 paid by France to Germany after the war of 1870-71. A similar indemnity has been demanded in all recent wars, on the principle of repayment to the conqueror of the costs of making war. It is aside from land exactions, since Germany took from France also the province of Alsace-Lorraine. The conduct of the United States has been generous in this respect. After the war with Mexico it paid that country for the territory occupied and retained, and after the war with Spain, in 1898, paid Spain $20,000,000 for its property in the Philippines. It was the same with the Boxer indemnity exacted from China in 1900, the United States remitting its share of this indemnity, a generosity not displayed by any of the European nations concerned.

Waring (wâr'ing), George F., engineer and author, born in Westchester Co., New York, in 1833. He was an engineer of Central Park, New York City, 1857-61, served in the Civil war, becoming a cavalry colonel, and afterwards attained distinction as a sanitary and agricultural engineer. He executed the new sewerage works of Memphis, Tennessee, in 1880, in 1895 was appointed street commissioner of New York, and surprised the people of that city by an honest administration, and in 1898 went to Havana and endeavored to eradicate the causes of yellow fever. The result was that he took the fever himself and died of it. He wrote *Elements of Agriculture, Sanitary Drainage, Village Improvements and Farm Villages*, etc.

Warming and Ventilation.

The condition of the atmosphere of our houses and apartments is of such importance to health and vigor of mind that warming and ventilation, two closely allied subjects, are receiving more and more attention as sanitary science advances. Their neglect has

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been the cause of, and is still responsible, for an incalculable amount of human disease and suffering. The body, to remain in health, requires a certain degree of heat; so that, if the surrounding atmosphere is too low in temperature, artificial means must be employed to raise it. The temperature which is found the most agreeable for the air of apartments, in which the occupants are not engaged in bodily exercise, is from 63° to 65° F. The charcoal brazier is a very ancient method of warming an apartment. The Greeks and other nations commonly used it, and they sought to correct the deleterious nature of the fumes by burning costly odorous gums, spices, and woods; but the carbonic acid given off by the combustion of charcoal is very injurious to health. The ordinary open coal-fire is, if not the most economical, at least the most agreeable means of heating apartments, but the waste of heat is very considerable. This waste early led to the introduction of closed stoves, first in earthenware and then in metal. These closed stoves, of which there are innumerable varieties in form and construction, are particularly favored in America and on the European continent, and certainly effect a great saving in fuel; but they do not form natural ventilators, like the open fireplaces, and are liable to overheat the rooms and to render the air in them too dry. For public buildings, warehouses, conservatories, etc., the most extensively employed systems of heating are those of steam and hot-water pipes. The hot-water apparatus, in its simple and practical form, was introduced by Atkinson in 1822. The circulation of water is brought about on the principle of the expansion of water by heat, and its greater lightness in consequence. Whatever be the height of the water above, the water when heated in the lower part of a boiler will rise to the surface, making room for other and cooler particles to be heated, in their turn; hence if a pipe full of water rise from the top of a boiler to any required height, and then return by gentle bends to the boiler at the lower part, heated water will rise and occupy the upright pipe, and the colder water will descend into the boiler to take its place. Thus a continuous circulation may be maintained through pipes in a building, the heated water rising up, passing on, and returning cooled, to the lower part of the boiler, causing a satisfactory temperature to be everywhere felt. The greater the elevation to which the heated water ascends, and the higher the initial temperature of the water, the greater is the motive power for circulation. There are also several systems of heating by passing steam or hot air through pipes.

Ventilation is the means of renewing the atmosphere, and of maintaining its purity by expelling foul air and admitting fresh, without drafts. Of the products which vitiate the air pulmonary exhalations are the most important. Air which has been utilized by living beings is always charged with carbonic acid, and also with a varying amount of watery vapor, the quantity of which is increased as the air is warmed; and smaller quantities of ammonia, and organic matter, especially bacteria, still further assist in rendering the atmosphere not only unfit but dangerous for respiration. Authorities on hygiene vary somewhat as to the amount of air necessary for healthy living rooms, but it is generally admitted that not less than 1000 cubic feet of fresh air per healthy person should be supplied every hour, and from 3000 to 4000 cubic feet to rooms occupied by invalids. We may renew the air in a room in an instant by throwing open doors and windows, but this process probably would be attended with danger to the health of the inmates from the violence with which the air currents would enter and leave the room. The most common form of ventilation is the chimney, and with a good fire in an open grate it proves under ordinary conditions to be sufficient. The difference in the weight of hot air and burnt gases in the chimney and the column of air outside supplies the motive force necessary to expel the former. Mechanical ventilation is generally effected by means of gratings in the ceilings or cornices in communication with flues leading into the open air, and a variety of arrangements have been invented to prevent down-drafts. Public and other large buildings are commonly ventilated in the roof, though sometimes by gratings in or near the floor, but this latter method is objectionable on account of draft. Automatic ventilation is, of course, irregular, owing to changes in wind and temperature, which increase or reduce, or even revert the motive power. In places where large numbers of people congregate and a uniform renewal of air is required, it is therefore necessary to resort to machinery. Many systems are in operation, varying with the nature of the building to be ventilated. Air flues, shafts, or pipes are usually the medium through which air passes in and out, and this passage is generally regulated

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by pumps or fans moved by steam or gas engines. The proper ventilation of mines forms one of the most difficult and important functions of a mining engineer. See *Mining*, and also *Sanitation*.

Warner (war'ner), CHARLES DUDLEY, author, was born at Plainfield, Massachusetts, in 1829, and was graduated from Hamilton College in 1851. In 1853 he was connected with a surveying party on the Missouri frontier; he then studied law and practiced in Chicago; became connected with the newspaper press; traveled in Europe; and in 1884 became joint-editor of *Harper's Magazine*. His works include: *My Summer in a Garden*, *Saunterings*, *Backlog Studies*, *My Winter on the Nile*, *In the Levant*, *Washington Irving*, etc. He edited *Library of the World's Best Literature*. Died October 20, 1900.

Warner, SUSAN, an American writer, born at New York in 1819; died in 1885. In 1851 she published, under the pseudonym of Elizabeth Wetherell, a novel entitled *The Wide, Wide World*, which soon attained extraordinary popularity on both sides of the Atlantic. *Queechy*, which appeared in 1852, was almost equally popular. She wrote also various other works, but none that had any special favor with the public.

Warp. See *Weaving*.

Warping (warp'ing), a mode of fertilizing poor or barren land by means of artificial inundation from rivers which hold large quantities of earthy matter, or *warp*, in suspension. The operation, which consists in inclosing a body or sheet of water till the warp has deposited, can only be carried out on flat low-lying tracts which may be readily submerged.

Warrant (wor'ant), an instrument or document authorizing certain acts which without it would be illegal. Warrants may be divided into executive, judicial, and commercial warrants. The first include *Death*, *Extradition*, and *Treasury Warrants* (authority to receive payments at the treasury). Common forms of judicial warrants are: the *Warrant of Arrest*, usually issued by a justice of the peace for the apprehension of those accused or suspected of crimes; the *Warrant of Commitment*, a written authority committing a person to prison; the *Distress Warrant*, a warrant issued for raising a sum of money upon the goods of a party specified in the warrant; the *Search Warrant*, an authority, generally granted to police-officers, to search private premises. Commercial warrants usually authorize the delivery of goods or money, such as *Dock Warrants*, *Dividend Warrants*, etc.

Warranty (wor'an-ti), in law, a guarantee or security; a promise or covenant by deed, made by a bargainer for himself and his heirs, to warrant or secure the bargainee and his heirs against all men in the enjoyment of an estate or other thing granted.

Warren (wor'en), a city, capital of Trumbull Co., Ohio, 14 miles N. W. of Youngstown. It has large potteries, extensive machine shops, produces electric lamps and appliances, etc. It is in a rich agricultural and dairying country. Pop. 11,081.

Warren, county seat of Warren Co., Pennsylvania, on the Allegheny River, 120 miles N. E. of Pittsburg on three railroads. It is in an agricultural and oil region, but the chief industries are connected with oil products and manufacturing. Here is a State Insane Asylum. Pop. 13,650.

Warren, a town in Bristol Co., Rhode Island, 10 miles S. E. of Providence. Cotton goods and yarn are manufactured. A trading post was established here in 1632. Pop. of town 6585.

Warren, GOUVERNEUR KEMBLE, military officer, born at Cold Spring, New York, in 1830; died in 1882. He was graduated at West Point Academy in 1850, and became a colonel of volunteers in 1861, and brigadier general in 1862. In 1863 he was made chief of topographical engineers, and subsequently chief of engineers. He was promoted major general in May, 1863, and in March, 1864, was put in command of the 5th corps of the army. General Sheridan was displeased with his conduct at the battle of Five Forks, April 1, 1865, and removed him from his command. He was mustered out in May, 1865, as major of engineers, and in 1876 was made lieutenant-colonel in the United States army. A statue of him was placed on Little Round Top, Gettysburg, in 1888.

Warren, JOSEPH, a Revolutionary patriot, born at Roxbury, Massachusetts, in 1741. On June 14, 1775, he was made major-general in the army before Boston; took part in fortifying Bunker Hill, and was killed in the Bunker Hill battle of June 17, 1775. A statue of him was erected at Bunker Hill in 1857.

War Revenue. The taxation act of 1917, designed

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to supply the United States government with funds, in addition to those raised by loan, for the expenses arising from the participation of this country in the European war, covered a wide scope, including taxes on ordinary incomes, upon excess profits in business operations, and on a large number of articles used in daily life operations. The taxes on incomes provided by the existing law covered a tax of 1 per cent on the net income of all single persons over $3000 and married persons over $4000, with a surtax on incomes over $20,000, this gradually increasing in percentage as the income grew larger. Under the new law the exemption is reduced and applies in the case of single persons to incomes over $1000 and of married persons to incomes over $2000. Under the 1917 enactment an additional supertax is imposed in the following rates: 1 per cent on amounts between $5000 and $7000, 2 per cent between $7000 and $10,000, 3 per cent between $10,000 and $12,000, 4 per cent between $12,000 and $15,000, 5 per cent between $15,000 and $20,000, 7 per cent between $20,000 and $40,000, 10 per cent between $40,000 and $60,000, 14 per cent between $60,000 and $80,000, 18 per cent between $80,000 and $100,000, 22 per cent between $100,000 and $150,000, 25 per cent between $150,000 and $200,000, 30 per cent between $200,000 and $250,000, 34 per cent between $250,000 and $300,000, 37 per cent between $300,000 and $500,000, 40 per cent between $500,000 and $750,000, 45 per cent between $750,000 and $1,000,000, and 50 per cent over $1,000,000. Under these laws the total tax on incomes of $100,000 amounts to $116,180; on incomes of $500,000 to $192,680; on those of $1,000,000 to $475,180. In addition to these taxes on individuals there is imposed a corporation tax of 40 per cent on the annual income of the corporation, joint stock company, etc.

Taxes on excess profits are also imposed, in addition to those above enumerated, upon the income of every corporation, partnership, or individual, these being equal to the following percentages of the net income: 20 per cent of the amount of the net income (in excess of certain deductions provided for), if not in excess of 15 per cent of the invested capital for the taxable year, 25 per cent of the net income if in excess of 15 but not of 20 per cent of the invested capital; and so on in increasing percentages up to 60 per cent of the amount of the net income in excess of 33 per cent of the invested capital. The amount of deduction is varied and intricate in its application to the different cases involved.

In addition to these income taxes, there is a considerable variety of war taxes, an important one being that on beverages. On distilled spirits now in bond or that may hereafter be produced in or imported into the United States, if intended to be used as beverages, a tax of $2.10 on every proof gallon, or wine gallon when below proof. If not to be used as beverages the tax is $1.10 per gallon. On beers, ales, porters and other fermented liquors, the tax will be $1.00 on every barrel containing not more than 31 gallons. The tax on cigars and other tobacco products varies in regard to the several forms which tobacco takes in manufacture and use and the prices at which these are sold. Thus 25 cents per 1000 are laid on cigars weighing not more than 3 pounds the 1000, if made to retail at from 4 to 7 cents each, and so on in an intricate variety of charges.

A war tax is laid on facilities furnished by public utilities and insurance. Under this head are taxes of 3 per cent on the charge for freight or express carriage by rail or water; and 8 per cent on the cost of tickets of travelers by rail or water; also 5 per cent on the cost of seats or berths in parlor or sleeping cars or on vessels. These taxes and various others came into effect on Nov. 1, 1917. Among the others were taxes on the various kinds of insurance, and on war excises on automobile trucks, wagons and motor cycles, the latter being 3 per cent of the selling price. In addition may be named player pianos, graphophones, moving picture films, jewelry, yachts, motor or pleasure boats, and a large variety of other articles used for pleasure purposes, including playing cards, toys and games; also perfumes, essences, toilet soaps and powders. In addition taxes are levied on pills, tablets, powders, chewing gums and other substances in great variety.

After December 1, 1917, a tax became imposed on tickets of admission to places of amusement of 1 cent on each 10 cents or fraction thereof, including admission by season ticket or subscription. Also all dues for membership in any club or association are taxed 10 per cent if amounting to over $12 per year. Stamp taxes are imposed on bonds, debentures or certificates of indebtedness of 5 cents for every $100 of face value; on indemnity and surety bonds a tax of 50 cents; on parcel post packages, when the postage amounts to 25 cents, of 1 per cent on each dollar or fractional part thereof; on postal cards and letters, and on numerous other articles to which a stamp tax is applicable.

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Warrington (wor'ing-tun), a town of Lancashire, England, with a small portion in Cheshire. River, canal, and railway communications secure it exceptional carrying facilities. Tanneries, iron, glass, and soap works, cotton mills, and breweries are numerous. The Manchester Ship Canal passes here. Pop. 72,178.

War Risk Insurance. See *Insurance.*

Warrnambool (wąr'nam-böl), a seaport town of Victoria, 170 miles southwest of Melbourne. It lies in a fertile agricultural district, and has an extensive trade in wool, flour, and dairy produce with Melbourne. Pop. 6410.

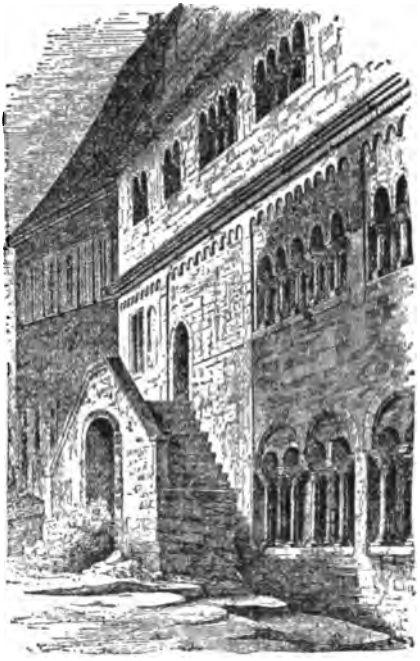
Warsaw (wąr'sa), a city of Russia, capital of Russian Poland, or the Vistula Province, as that country is now officially designated. It lies on the left bank of the Vistula, and extends for over 5 miles along that river. Its water communications have long made it one of the most important commercial centers of Eastern Europe, and it is now connected by rail with Moscow, Petrograd, S. W. Russia, Dantzic, and Berlin. Two bridges connect it with Praga, a suburb on the right bank of the river. Warsaw is famous for its huge churches, numerous and magnificent palaces and monuments, remnants of former Polish grandeur; for its educational institutions; and for its many and extensive gardens, parks, and suburban drives. It was formerly also exceptionally rich in literature and art treasures; most of these have been confiscated and transferred to Petrograd. Leather, boots and shoes, woolen and linen stuffs, plated ware, machinery, chemicals, spirits and beer, are some of the most important industrial products. It became an important place in the middle ages, and early in the seventeenth century supplanted Cracow as the capital of Poland. As such it was several times stormed and captured, coming under Russian rule in 1813. Although strongly protected by the fortresses on the Narev and Novo-Georgievsk on the Vistula, it was taken by the German armies on August 5, 1915, one year after the opening of the European war (*q. v.*). The population in 1913 was 872,000.

Warship. See *Navy* and *Ironclad.*

Wart (wąrt), a small dry hard tumor making its appearance most frequently on the hands, sometimes on the face, and rarely on other parts of the body, and occurring usually on children. Warts may be described as collections of abnormally lengthened pupillæ of the skin, and closely adherent and ensheathed in a thick covering of hard dry cuticle. In most cases they disappear of themselves, or they may be removed by applications of nitric or glacialacetic acid, etc.

War Tax. See *War Revenue.*

Wartburg (vårt'burh), an ancient mountain castle in Germany, near Eisenach, in the grand duchy of Saxe-Weimar. It was built in 1067 as a residence for the landgraves of Thuringia. Here, according to the legend, took



The Wartburg.

place the poetic contest known as the 'War of the Wartburg,' between Walther von der Vogelweide and six other eminent poets of Germany, in 1206. It was the residence of Luther in 1521-22, and the room in which he worked at the translation of the Bible is still shown.

Warthe (vår'tė), or WARTA, a river of Germany. It rises in Poland, 35 miles N. W. of Cracow, flows N. and W., then through Prussia W. N. W., and after watering Posen joins the Oder at Küstrin. Total length, 483 miles, of which 220 are navigable.

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Wart-hog, a name common to certain members of the hog family, genus *Phacochœrus*, distinguished from the true swine by their dentition, which in some respects resembles that of the elephants. The head is very large; immense tusks project from the mouth outwards and upwards, and the cheeks are furnished with flesh-like excrescences resembling warts. They feed on the roots of plants, which they dig up with their tusks. The African wart-hog or haruja (*P. Æliani*) of Abyssinia, and the vlackevark of the Dutch settlers of the Cape (*P. Æthiopicus* or *Pallasii*) are familiar species.

Head of Wart-hog.

Warton (wąr'tun), THOMAS, an English poet and critic, son of the Rev. Thomas Warton, professor of poetry at Oxford, was born at Basingstoke in 1728; died at Oxford in 1790. He was educated at Winchester, and Trinity College, Oxford, and early distinguished himself by his poetical compositions and criticisms. He was chosen professor of poetry at Oxford in 1757, a chair he filled with great ability for ten years; appointed Camden professor of history in 1785; and succeeded Whitehead as poet-laureate in the same year. Several church livings were also held by him. He rendered great service to literature by his *History of English Poetry* (1774-81), in three volumes, a work never completed.— His brother, JOSEPH (1722-1800), also deserves mention as a literary critic, and as headmaster of Winchester School (1766–96). To him we owe an essay on the *Writings and Genius of Pope.*

Warwick (wo'rik), a parliamentary borough of England, on a rocky hill on the right bank of the Avon, the county town of Warwickshire. The principal object of interest is Warwick Castle, the most magnificent of the ancient feudal mansions of the English nobility. Pop. 12,414.— The county has an area of 902 sq. miles. The surface is gently undulating, well watered, chiefly by the Avon and the Tame; the soil generally fertile, suitable for grain, root, and pulse crops, and there is a large amount of pasture for dairying and grazing purposes. Coal (output over a million tons per annum) and several kinds of building stone are abundant. Warwickshire is also famous for its manufactures and includes the two great manufacturing towns of Birmingham and Coventry (which see). Pop. (1911) 1,040,628.

Warwick (wąr'wik), a town (township) in Kent Co., Rhode Island. It contains several villages and has important cotton manufactories. Pop. 26,629.

Warwick, RICHARD NEVILLE, EARL OF, 'the kingmaker,' a great English nobleman, born in 1428; killed in 1471. He was the son of an earl of Salisbury, and became Earl of Warwick by marrying the heiress of the title and estates. Taking the Yorkist side in the Wars of the Roses, he was the main instrument in placing Edward IV on the throne in 1461 in place of Henry VI, and became the most powerful nobleman in the kingdom. Quarreling with Edward on account of the latter's marriage, he went over to Henry's side, and was able to place him again on the throne, but his army was defeated and himself slain in the battle of Barnet.

Washburn, EMORY, American jurist, born in Leicester, Mass., February 14, 1800; settled in Worcester in 1828; judge of the Court of Common Pleas 1844–48; governor of Massachusetts 1853 and 1854; professor of law at Harvard University 1856–76. He was the author of several works on jurisprudence, among them being *Treatise on the American Law of Real Property, Treatise on the American Law of Easements and Servitudes.* Died March 18, 1877.

Washburne, CADWALLADER COLDEN, American soldier, brother of Elihu Benjamin Washburne, born at Livermore, Me., April 22, 1818; settled at LaCrosse, Wis., in 1859. He was in Congress 1856–62; delegate to the peace conference in 1861. After the attack on Fort Sumter he raised the 2d Wisconsin Cavalry, of which he became colonel. Was active during the war and was made major-general in 1862. He was a member of Congress 1867–71, when he was chosen governor of Wisconsin. Died May 14, 1882.

Washburne, ELIHU BENJAMIN, statesman, born at Livermore, Maine, in 1816. He practiced law at Galena, Illinois, was elected to Congress in 1852, and remained there until 1869, when President Grant appointed him Secretary of State, and soon after Minister to France. During the Franco-German war he made the American legation a place of refuge for the Germans and other foreigners who would not leave Paris. For this he received honors from the German emperor. He published in 1887 *Recollections of a Minister to France*, and died in that year.

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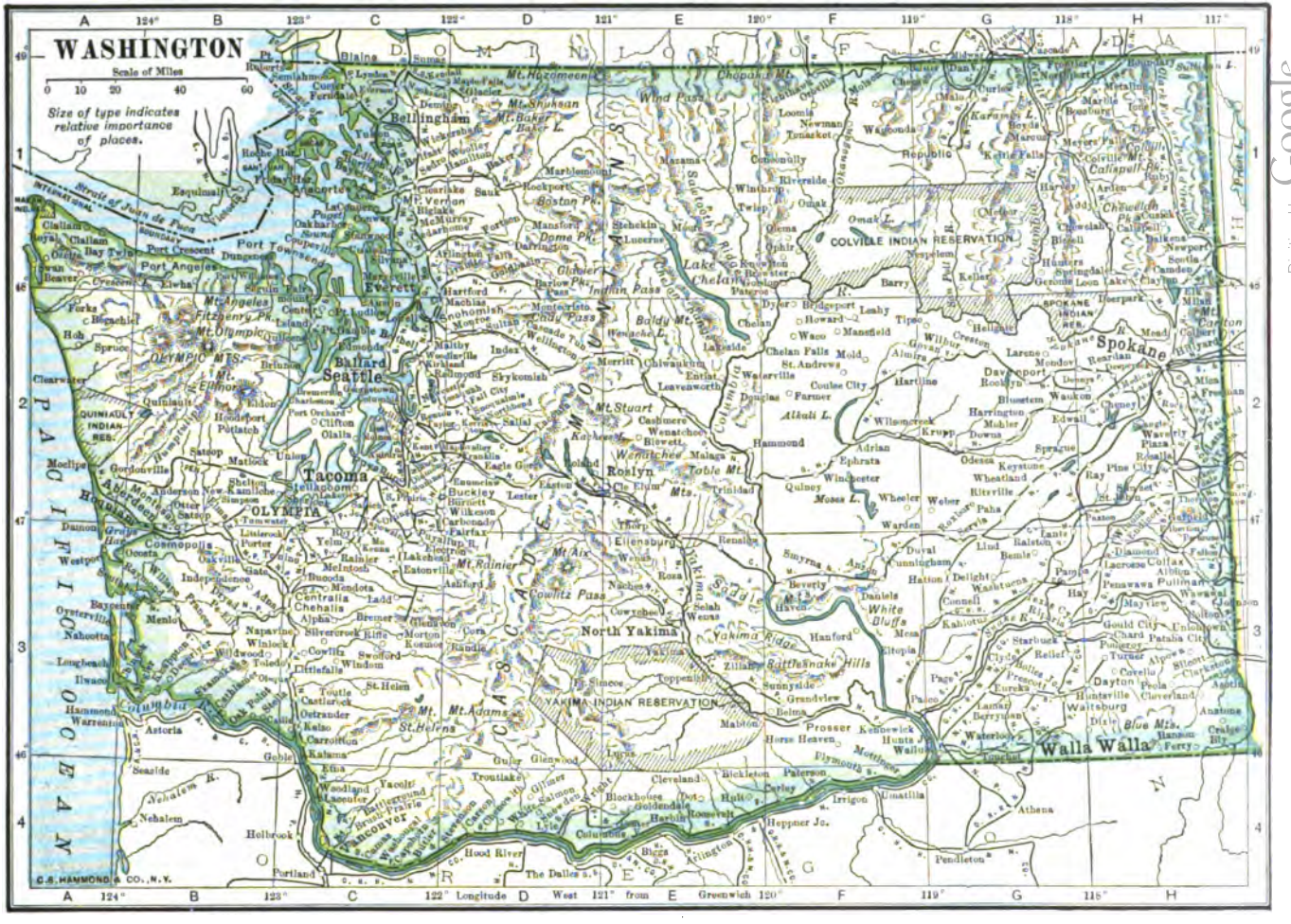
WASHINGTON
Scale of Miles
0 10 20 40 60
Size of type indicates relative importance of places.
Longitude West from Greenwich
C.S. HAMMOND & CO., N.Y.
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Washing-machine, a machine for washing clothes. A great number of machines have been contrived, the most general feature of them being that the clothes are agitated by artificial means in a vessel or trough containing the cleansing agents. There are many kinds of domestic washing-machines, one of the simplest being the dolly, a wooden disk with three or four projecting arms placed horizontally on an upright shaft in a tub. The shaft is fixed in a slip at the bottom and passes through a cross-piece at the top, and is turned either by a cross handle or by simple spur gear. The arms are moved around backward and forward among the clothes. Nearly all domestic washing-machines consist of a tub or cistern of a form suited to the character of the moving parts of the apparatus. Some operate by squeezing the clothes between grooved rollers, others by rubbing them between corrugated surfaces by a rocking or up and down movement, others have a combined squeezing and rubbing action, while still others are constructed on the principle of the old dash wheel used in dye and bleaching works. Some recent washing-machines, which have come into considerable use, consist of a ribbed drum or cage formed of tubes fixed into the end of the drum. The clothes are placed inside the cage, which is kept revolving in opposite ways by turns inside a thin metal case, the hot, soapy water circulating freely between the tubes.

Washington (wosh'ing-tun), one of the Pacific States of the American Union, in the extreme northwest section, being bounded N. by British Columbia, W. by the Pacific Ocean, E. by Idaho, and S. by Oregon; area, 69,127 sq. miles. Prior to 1861 it also comprised the present States of Idaho and Montana. It is drained by the Columbia and its tributaries, and the elevated Cascade Mountain range runs through the State from N. to S., about 100 miles from the Pacific coast, dividing it into two distinct parts. The western part is a rich timber country with heavy rainfall and many highly fertile valleys, in which hops, fruits of all kinds, and vegetables of immense size are grown. The eastern part is well adapted for the growth of all kinds of grain, and other farm products, some sections being admirably suited for wheat raising. Cattle and live stock of all kinds do well, the abundance of grasses and lightness of the snowfall permitting them to graze through the winter season. The State is very rich in natural resources and advantages, and the coast district enjoys a climate similar to that of Britain. Coal, iron ore and timber are abundant, and rich deposits of the precious metals are worked in the N. E. The Columbia River and Puget Sound swarm with salmon, which are tinned and exported. There are magnificent natural harbors on the Pacific. Puget Sound, which penetrates deeply into the State, is a vast harbor, with 1594 miles of shore line, and Seattle, its principal port, is becoming the metropolis of the northwest coast. Olympia, at the head of Puget Sound, is the capital. Shipbuilding is an important industry, and other manufactures are growing rapidly. More than 20,000,000 acres of the State are in timber, many of the trees being of immense size. Pop. (1910) 1,141,990.

Washington, capital of the United States, is in the District of Columbia, at the confluence of the Anacostia with the Potomac, here navigable by ships of the largest class; 230 miles by rail from New York, 40 miles S. W. of Baltimore. The site was selected in 1790 by Washington himself, and the plan of the city was drawn up on a most magnificent scale. The streets (70-120 feet wide) cross each other at right angles and are intersected diagonally by avenues (120-180 feet wide), which bear the names of States of the Union. A large number of these spacious thoroughfares are planted with fine shade trees, and are well paved and well kept. Numerous open spaces, large and small, some of them beautifully laid out, are distributed throughout the vast area occupied by the city. First among the numerous public buildings ranks the Capitol, an architecturally beautiful edifice on a hill above the Potomac, in the midst of a highly ornamented park of 50 acres. It consists of a central building of freestone, two wings (each with a dome) of white marble, and a lofty central dome of iron, surmounted by a statue of Liberty (total height, 307½ feet). The Rotunda, in the center of the main building, is a magnificent hall, adorned with bas-reliefs and paintings, and a colossal statue of George Washington. The entire structure covers 3½ acres, and cost over $13,000,000. It accommodates the two Houses of Congress, the U. S. Supreme Court, and until recently the Capitol also housed the extensive library of Congress, now transferred to a magnificent Congressional Library building, an extensive and imposing edifice in the Italian Renaissance style of architecture, erected in 1888-97, at a cost of $6,180,000. It measures 470 feet in length and 340 in width, its entrance

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hall and stairways being unsurpassed in beauty of design and decoration. This ornate edifice contains at the present time nearly 2,000,000 books, pamphlets, manuscripts, maps, etc. The collection is rich in history, political science, official documents and Americana (including important files of newspapers and manuscripts of colonial and later times). Northwestward from the Capitol extends Pennsylvania avenue, 160 feet wide and the most notable of the city's highways, its main drive extending to the Treasury building, an immense edifice in the Grecian style of architecture, near which is the president's house, or executive mansion, commonly known as the White House, built of free stone and surrounded by extensive grounds. It is handsomely furnished and is a place of interest to all visitors to the national capital. West of the White House is a large and handsome building accommodating three of the governmental departments, the State, the War and the Navy, it being 567 feet in length and 342 in width. Other important public edifices are the Land Office (formerly the General Post Office), of white marble; the Patent Office, with a great Doric portico; the building of the Smithsonian Institution (devoted to scientific research and the promotion of useful knowledge), of red sandstone, in the Byzantine style, with picturesque towers; the building of the Department of Agriculture; the Pension Office, Post Office and various others. An interesting edifice among them is the new structure of the United States National Museum, in which is housed an enormous collection of economic products, examples of art and manufacture, and objects of natural history, the latter including the extensive series of African animals contributed by ex-President Roosevelt as a result of his African hunting trip. Other institutions are the Army Medical Museum, with valuable pathological collections, the botanical garden and the zoological gardens, situated in the Rock Creek district. The United States Naval Observatory, of white marble, occupies a retired and commanding site on Georgetown Heights. Other interesting institutions are the Corcoran Gallery of Art, a notable collection of paintings and statuary, housed in a handsome new marble building; the Carnegie Institution, founded in 1902, 'to encourage investigation, research and discovery,' with an endowment by Andrew Carnegie of $10,000,000; the Washington Academy of Sciences, National Geographic Society, Biological Society, Anthropological Society, International Bureau of the American Republics, etc.

The National Soldiers' Home, two miles above the city, founded in 1851, has 523 acres of improved park and forest and serves as an attractive rural resort and free driving park, in addition to its function of providing a comfortable home for veterans and invalids of the United States Army. The National Asylum for the Insane, with nearly 1006 inmates (either of the Army or Navy, or from the District of Columbia), is situated on the heights above Anacostia, an eastern branch of the Potomac. Among the institutions of learning in the city are the George Washington (formerly the Columbian) University, Georgetown University (Roman Catholic), Howard University (for colored students), Catholic University of America, founded in 1887, American University (Methodist), and the National Deaf Mute College. Monuments are numerous, chief among them being the national Washington Monument, near the Potomac, a towering obelisk of white marble 555½ feet high, built at a cost of $1,230,000, and containing commemorative slabs from most of the States. Bronze statues, equestrian and others, are very numerous, there being hardly a public square or civic circle without its monument. The city, with its suburb of Georgetown (now West Washington), and the rural portion of the District, covers an area of about 70 square miles. In addition to its many small parks and the zoological park of 167 acres, it possesses Rock Creek Park of over 1500 acres, extending for miles along the picturesque banks of the stream, amid forests of great natural beauty. Washington is abundantly supplied with pure water by a conduit 15 miles long, from the Falls of the Potomac. Opposite, in Virginia, is Arlington, with its beautiful national cemetery, and about 15 miles below the city is Mount Vernon, formerly the home of Washington. Pop. 331,069. (See *Columbia, District of.*)

Washington, a city, county seat of Daviess Co., Indiana, 19 miles E. of Vincennes. It is in a farming and coal mining region, and produces canned goods, lumber, furniture and iron products, cooperage stock, underwear, etc. Pop. 7854.

Washington, a town, county seat of Beaufort Co., North Carolina, on the Tar River, 33 miles N. of Newbern. It has foundries and manufactures of lumber, knit goods, boats, buggies, flour, oil, etc. Pop. 6211.

Washington, county seat of a county of the same name in Pennsylvania, 25 miles S. W. of Pitts-

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THE WHITE HOUSE

The official residence of the President of the United States in Washington, D. C. It was begun in 1792, burned by the British in 1814, rebuilt in 1818.

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burgh. It is in a coal and oil region, and has extensive manufactures of tin plate, iron, steel, glass, etc. Here is Washington and Jefferson College and other collegiate institutions. Pop. 25,000.

Washington, BOOKER TALIAFERRO, educator, born of African parentage at Hale's Ford, Virginia, about 1859. The son of a slave, he succeeded in obtaining entry at Hampton Institute, was graduated in 1875 and taught there until put in charge of the Tuskegee Normal and Industrial Institute, Alabama, in 1881. This, under his care, has made a remarkable progress in industrial education, and has done much toward solving the race problem between the blacks and whites, while its president is regarded as one of the most remarkable men of the age. He has published *Sowing and Reaping, Up from Slavery, Future of the American Negro* and various other works. Died in 1915.

Washington, BUSHROD, judge, was born in Westmoreland County, Virginia, in 1759; died in 1829. He was a nephew of George Washington, and a member of the Virginia Convention which ratified the Constitution of the United States in 1788. In 1798 he was appointed a justice of the United States Supreme Court. The estate of Mount Vernon was left to him in the will of his illustrious uncle.

Washington, GEORGE, the hero of American independence, and the 'father of his country,' as he has long been popularly called, was born at Bridges Creek, Westmoreland County, Virginia, February 22, 1732. He came of good English stock, being the grandson of John Washington, who emigrated in 1657 from Northamptonshire, England, where the Washington family had been one of excellent standing. In Virginia John Washington and his brother Lawrence brought a large tract of land on the western side of the Potomac and about fifty miles above its mouth. Here John married, acquired wealth and position, and left the paternal homestead to his second son Augustine, who was the father of George Washington by his second wife, Mary Ball. George was but ten years of age when his father died, six children in all being left to the mother's care. Little or nothing is known of his childhood, though various problematical stories have gathered about his name, some of them, possibly, based upon fact. He appears to have been a strong, healthy boy, quiet and thoughtful beyond his age, not brilliant as a student, but with the innate qualities of a man of action. In 1747 he went to Mount Vernon, then the residence of his half-brother Lawrence, who had inherited the greater part of the estate. This gave him access to books and to better teachers and brought him in contact with Lord Fairfax, a relative of Lawrence's wife, who possessed a large tract of land in the Shenandoah Valley. The boy, who had been dissuaded by his mother from entering the British navy, had acquired some knowledge of mathematics and surveying, and was employed by Lord Fairfax in 1747 to survey his valley property. He alternated surveying with hunting, spent the winters at Mount Vernon, and in 1751 accompanied his brother, stricken with consumption, to Barbadoes. Here Lawrence died in 1752, leaving George guardian of his only daughter and heir to his estate if she should die without issue. Lawrence had already given his younger brother instruction in the use of arms and the art of war, a training soon to become useful. He was appointed adjutant-general in the Virginia militia at the age of nineteen, and in 1752, when twenty-one years of age, was chosen for a service of great importance. The French had built some forts on territory near Lake Erie claimed by Virginia, and Governor Dinwiddie sent a messenger to warn them off. The messenger returned in fright before finishing his work and the governor now chose Washington, possibly at Lord Fairfax's instigation, as a strong and capable young man, familiar with the ways of the wilderness and fitted for the duty. There was no turning back by the new messenger. He made a long and perilous journey through the wilderness and over the mountains to the French forts south of the Ohio, gave the warning required, and took occasion to study the Indian situation and gain a definite idea of the designs of the French. On his return, which was accomplished at great risk of life, he suggested to the governor the building of a fort at the point where the Monongahela and Alleghany rivers unite to form the Ohio. In the following spring the French came down the Alleghany, drove away the British workmen, and completed the fort for themselves. Washington's military career now began. He was made second in command of a force sent from Virginia to deal with the French, but the death of the colonel threw the command into his hands and he performed his responsible task with great skill and judgment. Outnumbered by the French, he built a small woodland fort where he defended himself with soldierly resolution, surrendering only when defense had become hopeless and favorable

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terms were offered.

Orders being sent from England that any English field officer should be superior in command to any colonial officer, even one of higher rank, Washington at once resigned; but in 1755 he consented to accompany Braddock as a volunteer on his unfortunate expedition. The affair would have ended very differently if the opinionated Englishman had listened to the advice of his Virginian aide-de-camp, but, as it proved, Washington was almost the only officer who returned unharmed from the disastrous expedition. He was now placed at the head of the Virginia forces, and in 1756 visited Boston and had an interview with General Shirley, the commander-in-chief, with whom he satisfactorily settled the question of rank. During the remainder of the war he was occupied on the frontier, where the Indians were attacking the settlers, and in 1758 accompanied General Forbes in the second expedition against Fort Duquesne. He commanded the part of the army which occupied that fort in November, 1758, and by putting an end to the operations of the French in that quarter, settled the question of ownership of the Ohio region. This ended his military career for that period. Elected in 1758 to the House of Burgesses of Virginia, he was on his first appearance highly complimented by the speaker for his military service. Washington rose to reply, but in such a state of nervousness, that he could not speak a word. 'Sit down, Mr. Washington,' said the speaker; 'Your modesty equals your valor, and that surpasses the power of any language I possess.' In 1759 he married Martha Custis, a rich young widow, and settled down to the life of a farmer at Mount Vernon, which had fallen to him through the death of his niece. This, added to the estate of his wife, made him one of the richest men in the land, his estate growing through purchase until it reached a total of 8000 acres. He managed it himself, kept his own books, and handled all his affairs with method and judgment while winning a reputation for mercantile integrity. For years he remained a member of the House of Burgesses, but took no prominent part in its debates, being ever more a man of action than an orator. In 1773 he came again prominently into public affairs as a member of the convention that met at Williamsburg and asserted the right of the colonies to self-government, declaring that taxation and representation could not justly be separated. This convention chose him, with Patrick Henry and five others, to represent Virginia in the Continental Congress which met at Philadelphia in September, 1774. At the end of the first session, when Patrick Henry was asked whom he considered the greatest man in the Congress, he replied, 'If you speak

George Washington.

of solid information and sound judgment, Colonel Washington is unquestionably the greatest man on that floor.'

Washington and his fellow patriots had not aimed at separation from the mother-country, but simply at justice and fair treatment, but after the affair at Lexington, April 19, 1775, nothing remained but to resist British tyranny by force of arms, and on the 15th of June Washington was unanimously elected by Congress the commander-in-chief of the American forces. He had continued a member of Congress, but now left it to take command of the forces then besieging Boston. The battle of Bunker Hill had taken place, with much credit to the provincials for bravery, but Washington found the militia a disorganized mass, more an armed mob of patriots than an army. It took him some time to understand this half disciplined body of New Englanders, and for them to understand him, but he soon brought order out of confusion and won the love and respect of his men. Munitions of war were greatly lacking and Congress was nearly destitute of money or credit and sadly unfit to deal with the situation. Under these circumstances it is a matter of great credit to Washington that in nine months' time he forced the British to evacuate Boston with their army of veterans and surrender to him the first seat of the war.

We must deal briefly with the remaining history of the war, the events of which are noted under UNITED STATES. The defeat of the Americans on Long Island led to the loss of New York and the retreat of Washington across New

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Jersey, followed by the brilliant victory at Trenton on Christmas night, 1776, and the subsequent victory at Princeton, on January 3, 1777. These successes greatly revived the spirits of the Americans, which had been much depressed by the preceding ill fortune, but Washington had still many difficulties to contend with in the lack of recruits, the want of money and war materials, and the superiority of his foes in all military requisites. Their one lack lay in their commanders, among whom Cornwallis was the only able soldier. In military genius none of them compared with Washington, and he did not fail to take advantage of their weakness and inefficiency. The next movements of the enemy were Burgoyne's disastrous march southward from Canada and Howe's expedition against Philadelphia by way of Chesapeake Bay. Washington's army was defeated by superior forces at the Brandywine, the British occupied Philadelphia, and their alert opponent soon after attacked them at Germantown, losing the battle mainly through the confusion caused by a fog. But the loss in this quarter was recompensed by the defeat and capture of Burgoyne's army at Saratoga, and Washington's army went into winter quarters at Valley Forge with reviving hope from the cheering news from the North. The winter was a severe one and the men at Valley Forge suffered greatly from want of clothing and other necessaries. The spirit of their great leader, however, remained unbroken, and when the tidings of the alliance with France and the danger of the Delaware being closed by a French fleet caused the British to evacuate Philadelphia, Washington was quickly on their track, attacked them at Monmouth, and probably would have given them a crushing defeat but for the misconduct of one of his subordinates. The following winter was passed by the American army at Morristown, New Jersey, and in 1780 the war was transferred to the South, the weakness and destitution of Washington's army obliging him to remain on the defensive, though closely watching the movements of the enemy in and about New York. The climax came in 1781, when Lord Cornwallis injudiciously moved his army to Yorktown, Virginia, fortified that place and awaited reinforcements from New York. The alert American commander took instant advantage of the opportunity. He had been reinforced by a French army, a French fleet had entered Chesapeake Bay and cut off Cornwallis' communication with New York, and Washington at once set out on a hasty southward march, besieged Yorktown with a force of about 15,000 men, and on October 19 forced Cornwallis to surrender his forts and his force of 7000 veterans. It was the most important event of the war, since it brought it to a rapid close, the discouraged British government giving up the struggle.

Throughout this contest, Washington was obviously the strongest and ablest man in the field, quiet, energetic, capable, rarely losing his temper, quick to take advantage of every opportunity, resolute in endurance, bearing the attacks of his enemies, the lack of resources, the continued difficulties which surrounded him, with the spirit of a hero and the composure of a philosopher, and triumphing in the end as such men must triumph, through an innate force of character that never yields to defeat. Washington has since been regarded as a military genius of a high type, not a dazzling meteor of war like Alexander or Napoleon, but a leader capable of obtaining great results by the wise handling of slender means. A patriot in grain, whose only desire was the independence of his country, he vigorously rejected the demand of his followers that he should make himself a king, and retired to his home at Mount Vernon, taking up with composure and relief his old pursuit of agriculture.

He was not permitted to remain in seclusion. Confusion and inefficiency reigned supreme in governmental relations and the necessity of a stronger government became daily more manifest. In the events that followed, leading to the calling of the Constitutional Convention of 1787, Washington took an active part, and he was chosen president of the convention which, in the short space of a few months, devised the admirable Constitution which has since formed the basis of government of the United States. Unanimously elected the first president of the new Union, he accepted it, as he said, 'with more diffidence and reluctance than ever I experienced before in my life.' The mental characteristics which make a man a great soldier are usually not those that fit him to be a constitutional governor, but Washington's judgment, good sense and moderation adapted him very well to his new duties, and he dealt with the difficulties that surrounded him in his new position with a wisdom that few of his associates manifested. Reëlected in 1792, he reluctantly resumed the duties which removed him from the private life that appealed more to his disposition, especially in view of the fact that he was

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assailed by political foes as virulently as he had formerly been by military foes. On the 7th of December, 1796, he for the last time met the Houses of Congress, and made to them a dignified Farewell Address, so full of wise advice that it has since been regarded as one of the great state papers of the country. Declining a third term in office, he retired again to Mount Vernon, but in 1798 his services were once more demanded by his countrymen. A naval conflict had arisen between France and the United States, there was danger of a declaration of war, and a small army was raised, of which Washington was appointed commander-in-chief. Fortunately no war followed and the home life of the venerated chief was not again disturbed. He died after a short illness, due to acute laryngitis, at Mount Vernon, on December 14, 1799.

History presents us with few characters so worthy of our admiration and esteem as George Washington. His mental gifts were not of the dazzling kind nor were his talents of the brilliant order, yet he possessed the essentials of wisdom in a high degree, his powers and traits of character being so finely proportioned and adjusted and so firmly controlled by a heroic will and high moral faculty, as to enable him to withstand alike disaster and obloquy, to reject the promptings of ambition, and to pursue the even tenor of his way unmoved by but one aspiration, to promote the happiness, prosperity and good government of his country. The equipoise and harmony of his powers, his keen foresight and rare judgment, led to that wise discrimination which is the outcome alike of well developed mental and moral faculties. Washington merited the noble title of 'Father of his Country.'

Washington Court House,

a city, county seat of Fayette Co,. Ohio, on Paint Creek, 75 miles E. N. E. of Cincinnati. It has a poultry packing house, and manufactures of stoves, furniture, shoes, fertilizers, etc. Pop. 8000.

Washington and Lee University,

the outcome of the Augusta Academy, Augusta Co., Virginia, founded in 1749. Becoming the Washington Academy, it was removed in 1803 to Lexington, Va. Before the Civil war 'Stonewall' Jackson was one of its professors. In 1865 Gen. Robert E. Lee became its president, and after his death, in 1870, it was given its present name. In 1900 it had 42 instructors and about 600 pupils.

Washington Monument,

a magnificent monument erected at Washington, D. C. by the American people in honor of George Washington. It stands in the Mall, a public park extending to the Potomac, and is 555½ feet high and 55 feet, 1½ inches square at base, tapering upward to 34 feet, 5½ inches square. It is built of blocks of marble two feet thick, and has a stairway and an elevator in its interior, the States having contributed richly carved stones for the decoration of its interior walls. The corner-stone was laid in 1848 and the work finished Dec. 6, 1884.

Washita (wosh'i-tą), a river of Arkansas and Louisiana, an affluent of Red River; length, 600 miles; valuable for navigation.

Wasp (wosp), the common name applied to insects of various genera belonging chiefly to the family Vespidæ, order Hymenoptera. Those best known belong to the genus *Vespa*, and live in societies, composed of females, males, and neuters or workers. The females and neuters are armed with an extremely powerful and venomous sting, especially so in the Hornet.

Waste Products, Utilization of.

In the process of manufacture much substance is useless for the purpose intended and vast quantities of material have in the past been thrown aside as 'waste.' Within later times much of this material has been found useful for other purposes, being at times more valuable than the original product. This utilization of waste has proceeded to such an extent that comparatively little material is now discarded as useless. Thus 'waste silk' is now valuable, though it retains this name. Rags of all kinds are now so much in demand that no one speaks of them as waste. Much heat was wasted in the past which is now made useful. The vast heaps of waste coal dust at the mines are now being converted into burnable briquets and utilized in other ways, and the refuse of old smelting works is being made to yield metal by improved processes. The science of chemistry has done much in utilizing refuse, coal tar, for instance, now yielding a multitude of useful products. The saving effected by this utilization is too varied to be further particularized, and the saving amounts to vast sums.

Watch (woch), a well-known pocket instrument for measuring time, invented at Nürnberg in the end of the fifteenth century. The wheels in watches

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are urged on by the force of a spiral spring, generally of steel, contained in a cylindrical barrel or box, to which one end of a chain is fixed, the chain also making several turns round the barrel outside; the other end of the chain is fixed to the bottom of a cone with a spiral groove cut on it, known as the fusee (which see). On the bottom of the fusee the first or great wheel is put. The barrel-arbor is so fixed in the frame that it cannot turn when the fusee is winding up. The inner end of the spring hooks on to the barrel-arbor, the outer to the inside of the barrel. If the fusee is turned round in the proper direction it will take on the chain, and consequently take it off from the barrel. This coils up the spring; and if the fusee and great wheel are left to themselves, the force exerted by the spring in the barrel to unroll itself will make the barrel turn in a contrary direction to that by which it was bent up. This force communicating itself to the wheels will set them in motion. Their time of continuing in motion will depend on the number of turns of the spiral groove on the fusee, the number of teeth in the first or great wheel, and on the number of leaves in the pinion upon which the great wheel acts, etc. The necessity of keeping the watch from 'running down,' and of making the wheels move with uniform motion, gave rise to the use of the balance-wheel and hair-spring (taking the place of the pendulum of a clock) and the variously and ingeniously designed mechanism, the escapement (which see). On the perfection of the escapement the time-keeping qualities of a watch largely depend. Of the many varieties invented and perfected, watches are now almost exclusively provided with either the horizontal, the lever, the chronometer or the detached escapement. (See *Chronometer.*) In all but the best class of modern watches the fusee has been abandoned in favor of the going-barrel. The latter offers better facilities for keyless work, and keyless watches are manufactured in great quantities. The going-barrel watch can also be produced at a cheaper rate, and for ordinary purposes is amply reliable. The mainspring in this class of watch is very long, but only a few coils are brought into action. The great wheel is attached to the going-barrel itself, thus the spring force is directly transmitted to the escapement. The invention of the spiral hair-spring by Dr. Hooke (about 1658), the scientific application of its properties since, and the intelligent use of compensation (which see) in the balance, have combined to give to the best chronometers of to-day a uniformity of rate which it is probably impossible to excel. A number of watches for special performances are also constructed. Such are the calendar watch, the repeater, the chronograph (which see), etc. Large quantities of the cheaper class of watches are now made by machinery in the United States, Switzerland, France, Germany, and England. They are generally produced on the interchangeable system, that is, if any part of a watch has become unfit for service, it can be cheaply replaced by an exact duplicate, the labor of the watch repairer thus becoming easy and expeditious.

Watch (nautical), a certain part of the officers and crew of a vessel who together work her for an allotted time, the time being also called a watch. The time called a *watch* is four hours, the reckoning beginning at noon or midnight. Between 4 and 8 P. M. the time is divided into two short or *dog-watches*, in order to prevent the constant recurrence of the same portion of the crew keeping the watch during the same hours.

Water (wa'ter), a liquid which covers the greater part of the earth's surface. It was classified among the elements until the close of the eighteenth century, when Lavoisier, profiting by the experiments of Cavendish, proved it to be a compound of hydrogen and oxygen, in the proportion of two volumes of the former gas to one volume of the latter; or by weight 2 parts of hydrogen to 16 parts of oxygen; hence its chemical formula is H_2O. Pure water is a colorless, tasteless, inodorous liquid; a powerful refractor of light; a bad conductor of heat and electricity; it is very slightly compressible, its absolute diminution for a pressure of one atmosphere being only about 51.3 millionths of its bulk. Although water is colorless in small quantities, it is blue like the atmosphere when viewed in mass. It takes a solid form, that of ice or snow, at 32° F. (0° C.), and all lower temperatures; and it takes the form of vapor or steam at 212° F. (100° C.) under a pressure of 29.9 ins. of mercury, and retains that form at all higher temperatures. Under ordinary conditions water possesses the liquid form only at temperatures lying between 32° and 212°. It is, however, possible to cool water very considerably below 32° F. and yet maintain it in the liquid form. Water may also be heated, under

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pressure, many degrees above 212° F. without passing into the state of steam. The specific gravity of water is 1 at 39.2° F., being the unit to which the specific gravities of all solids and liquids are referred, as a convenient standard, on account of the facility with which it is obtained in a pure state; one cubic inch of water at 62° F. and 29.9 inches barometrical pressure, weighs 252.458

Tank and Pump House.

grains. Distilled water is 815 times heavier than atmospheric air. Water is at its greatest density at 39.2° F. (= 4° C.), and in this respect it presents a singular exception to the general law of expansion by heat. If water at 39.2° F. be cooled, it expands as it cools till reduced to 32°, when it solidifies; and if water at 39.2° F. be heated, it expands as the temperature increases in accordance with the general law. In a chemical point of view water exhibits in itself neither acid nor basic properties: but it combines with both acids and bases, forming *hydrates;* it also combines with neutral salts. Water also enters, as a liquid, into a peculiar kind of combination with the greater number of all known substances. Of all liquids water is the most powerful and general solvent, and on this important property its chemical use depends. Without water not only the operations of the chemist but the processes of animal and vegetable life would come to a stand. In consequence of the great solvent power of water it is never found pure in nature. Even in rain-water, which is the purest, there are always traces of carbonic acid, ammonia, and sea-salt. Where the rain-water has filtered through rocks and soils, and reappears as spring or river water, it is always more or less charged with salts derived from the earth, such as sea-salt, gypsum, and chalk. When the proportion of these is small the water is called *soft*, when larger it is called *hard water*. The former dissolves soap better, and is therefore preferred for washing; the latter is often pleasanter to drink. Some springs contain a considerable quantity of foreign ingredients, which impart to the water particular properties. They are known under the general term *mineral waters*, and according to the predominating constituents held in solution are divided into carbonated waters (alkaline, magnesian, calcareous, and chalybeate), sulphatic waters (containing chiefly sulphates), chlorinated waters (containing chiefly chlorides), and sulphuretted waters (containing large quantities of sulphides or of sulphuretted hydrogen). The only way to obtain perfectly pure water is to distil it, but matter simply held in suspension may be got rid of by suitable filtration. The great reservoirs of water on the globe are the oceans, seas, and lakes, which cover more than three-fifths of its surface, and from which it is raised by evaporation, and, uniting with the air in the state of vapor, is wafted over the earth ready to be precipitated in the form of rain, snow, or hail, and make its way by river channels to the sea. Water, like air, is absolutely necessary to life, and healthy human life requires that it should be free from contamination, hence an ample and pure water supply is considered as one of the first laws of sanitation. In addition to the abundant surface pressure of water, it penetrates the rock crest of the earth to considerable depths and by its sol-

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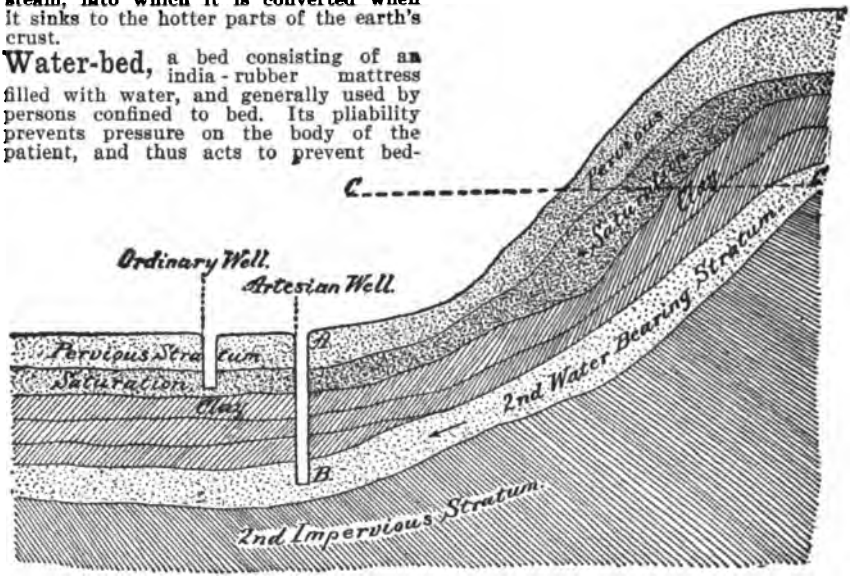
vent powers produces important effects. It can be reached by boring in some of the most arid parts of the earth, and rising to the surface as artesian waters, brings fertility to desert regions. It is supposed also to be the cause of volcanic eruptions, through the explosive force of steam, into which it is converted when it sinks to the hotter parts of the earth's crust.

Water-bed, a bed consisting of an india-rubber mattress filled with water, and generally used by persons confined to bed. Its pliability prevents pressure on the body of the patient, and thus acts to prevent bed-sores. Water-beds, however, have been largely superseded by the more convenient and healthier air-beds (which see).



Geological Drainage of Water into Wells.

Water-beetle, the name given to various species of beetles, having legs adapted for swimming, the two hinder pairs being flattened and fringed with hairs. They are exceedingly voracious both in the adult and larval state, even devouring young fishes.

Water-boatman (*Notonecta glauca*). See *Boat-fly.*

Waterbury (-ber-i), a city of New Haven Co., Connecticut, in a valley on the Naugatuck River, 77 miles northeast of New York. It is an important railway junction and manufacturing town. Brass and brass goods are the staple products, the largest part of the output of the country being produced here. It is also the seat of the Waterbury watches and clocks, which are known throughout the world. Electro-plate is also made and there are numerous rolling mills and foundries and extensive manufactures of pins, buttons, pearl goods, lamps and many other products. The city contains a number of benevolent and academic institutions. Pop. 73,141.

Water-chestnut. See *Trapa.*

Water-clock. See *Clepsydra.*

Water-colors, used in painting are colors carefully ground up with water and isinglass or other mucilage instead of oil. Water-colors are often prepared in the form of small cakes dried hard, which can be rubbed on a moistened palette when wanted. Moist water-colors in a semi-fluid state are also used; they are generally kept in metal tubes, which preserve them from drying up.

Water-cress (*Nasturtium officinale*), a cruciferous plant distributed throughout Europe, Western Asia, North Africa, introduced into North America and certain British colonies, and choking some rivers of New Zealand, where the stem grows as thick as the

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wrist. It grows on the margin of clear streams, or even partly immersed in the water. It has antiscorbutic properties, and is cultivated near many large towns to be used as salad, or otherwise.

Water-cure. See *Hydropathy*.

Water-dog, a variety of dog having a curly coat, long ears, a rounded head, and webbed toes. It seems to be allied to the poodle, but differs from the latter in its firmer set and stouter body, and in its larger size. The water-dog is highly intelligent, but less so than the retriever. It is usually of a grayish white varied with black and brown.

Waterfall. See *Cataract*.

Water-flea, a name given to various genera of small swimming crustaceans belonging to the class Entomostraca. Among the commonest are *Cypris* and *Cyclops* (which see). One very familiar water-flea is the *Daphnia pulex*. See *Daphnia*.

Waterford (wa'ter-furd), a city and seaport in the southeast of Ireland, capital of the county of same name, 97 miles s. s. w. of Dublin, on the right bank of the Suir, which soon after

joins the Barrow, the combined stream reaching the sea by the fine estuary known as Waterford Harbor. It stretches along the Suir for about 1 mile, has convenient quay accommodation for large vessels, and commands a considerable shipping trade. The bulk of the manufactures of Waterford county are carried on at Waterford and its vicinity, and most of the exports pass through Waterford Harbor. There are large bacon-curing establishments, breweries, saw and flour mills, etc. The principal buildings are the Episcopal and Roman Catholic cathedrals. Pop. 26,769.— The county belongs to the province of Munster. The area is 721 sq. miles. The coast is in general bold and rocky, and besides the harbors of Waterford and Youghal at its east and west extremities respectively, has the deep indentations of Dungarvan Harbor and Tramore Bay. The interior is largely rugged and mountainous. The principal rivers are the Suir and the Blackwater. Dairying is the chief resource of the rural population. Slate, sandstone, and marble are quarried, and there is a large export of potter's clay. The fisheries are valuable. Pop. 87,187.

Water-gas, a gas prepared by passing steam through incandescent carbon. It is used for heating and welding purposes in metallurgy, and also for illumination, especially in the United States. Numerous deaths from poisoning have resulted from its use, however, this being largely due to its want of smell. Burnt in the usual way it gives a blue flame, but by suspending a comb of thin magnesium rods in the flame the filaments are quickly heated to a white heat, producing a bright glow light of high illuminating power, but which is neither unpleasant to the eye nor prejudicial to the sight. *Mantels* made of several infusible metals are now in common use and give a brilliant light with a comparatively small consumption of gas.

Water-glass, a substance which, when solid, resembles glass, but is slowly soluble in boiling water, although it remains unaffected by ordinary atmospheric changes. It consists of the soluble silicates of potash or soda, or a mixture of both. It is prepared either by breaking down and calcining flint nodules, the fragments or particles of which are then added to a solution of caustic potash or soda, whereupon the whole is exposed for a time to intense heat, or by fusing the constituents together in a solid state, and afterwards reducing them to a viscid condition. Among the purposes to which water-glass is applied are painting on glass, coating stone, wood and other materials to render them waterproof, glazing scenery and paintings, fixing wall-paintings, etc.

Water-hen. See *Gallinule*.

Water-hog. See *Capybara*.

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From the Painting by V. Checa.

THE RAVINE AT WATERLOO

One of Napoleon's desperate charges to stem the tide of defeat on the great Belgian battlefield came suddenly on the sunken road of Ohain, into which horses and riders plunged to death, forced over the brink by the pressure of the ranks behind.

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Waterhouse (wa'ter-hous), ALFRED, architect, was born at Liverpool in 1830; studied architecture in Manchester, and designed various important buildings in that city and London. He also partly reconstructed Balliol College, Oxford and Caius and Pembroke, Cambridge. He was elected a royal academician in 1885.

Waterhouse, JOHN WILLIAM, an English painter, born about 1840, became a member of the Royal Academy in 1895. Among his paintings are *Mariamne, Ulysses and the Sirens* and *The Lady of Shalott.*

Water-lily. See *Nymphæaceæ, Lotus, Nelumbium, Victoria Regia.*

Waterloo (wa-ter-lō'), a village of Belgium, nearly 10 miles S. S. E. of Brussels. It is famous for the memorable battle which was fought here on June 18, 1815, and which finally shattered the power of Napoleon. The Prussian defeat at Ligny, and his own unsuccessful engagement at Quatre-Bras on the 16th of June, caused Wellington to retire towards Waterloo, while Blücher concentrated his troops at Wavre, about 10 miles distant. The whole British position formed a sort of curve, the center of which was nearest to the enemy. The French forces occupied a series of heights opposite, there being a valley of no great depth, and from 500 to 800 yards in breadth, between them. Each army probably consisted of about 70,000 men. The object of Napoleon was to defeat the British, or force them to retreat, before the Prussians, who, he knew, were coming up, could arrive in the field; while that of the Duke of Wellington was to maintain his ground till he could be joined by his allies, when it might be in his power to become the assailant. The French began the battle about noon, and it continued with great fury till evening, when the appearance on the scene of the Prussians caused Bonaparte to redouble his efforts. His imperial guards, which had been kept in reserve, made a final attempt. Wellington's line, however, charged them at the point of the bayonet, and the imperial guard began a retreat, in which they were imitated by the whole French army. The British left the pursuit to the Prussians. The whole French army was dispersed and disabled, and their artillery, baggage, etc., fell into the hands of the conquerors. Their loss in killed, wounded, and prisoners amounted to between 40,000 and 50,000. The allied loss amounted to 23,000 killed and wounded.

Waterloo, a city, county seat of Blackhawk Co., Iowa, on Cedar River, 100 miles N. E. of Des Moines. It is the trade center of a wide farming and grazing region, and has railroad repair shops, canning and packing factories, and manufactures of gasoline engines, automobiles, farming and creamery implements, etc. Pop. 35,000.

Waterloo, STANLEY, author, born in St. Clair Co., Michigan, in 1846. He became a journalist and editor of various papers, the latest the Washington *Critic and Capital.* His works include *A Man and a Woman, Armageddon, The Wolf's Long Howl, The Seekers, These Are My Jewels, The Cassowary,* etc.

Watermelon, a favorite fruit, cultivated largely in the United States and many other countries for its cool and refreshing juice and palatable pulp. It often grows to a very large size, resembling the pumpkin in shape. It is the melon of Scripture.

Water-ousel, or DIPPER. See *Dipper.*

Water-pitcher, the popular name of plants of the order Sarraceniaceæ, the leaves of which somewhat resemble pitchers or trumpets in general form.

Water-plantain, the common name of various species of plants of the genus *Alisma,* nat. order Alismaceæ. One species, *A. Plantago* (great water-plantain), is a common wild plant in wet ditches and by river sides.

Water Power, a general phrase applied to the various means by which the energy of moving water may be utilized. To make such a source of energy effectual it is necessary and sufficient to have the water falling from a higher to a lower level. Such conditions more or less favorable exist in all streams, though in many cases the fall is so slight and the velocity of the water so small that practically no useful work can be obtained. Of the various machines by which the necessary transformation is usefully effected, the most common are what are known as water-wheels, in their several forms of turbines, undershot wheels, breast-wheels, and overshot wheels (see these terms). Recently the application of water-power through the aid of turbines to the development of electricity and its secondary application in this form to power purposes at great distances from its source, together with the growing cost of coal as a source of power and its threatened exhaustion in some

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localities, have brought the question of the conservation and utilization of water-power into great prominence as a probably indispensable need of mankind. Its most important application in this direction hitherto made has been that of the Falls of Niagara power-works, both on the American and the Canadian side. Here enormous electrical power has been developed by the use of turbines, its most important application being in the city of Buffalo for manufacturing, electric railways and otherwise. It has also been applied extensively in Canada. A great dam on the lower Susquehanna, recently completed and estimated to yield 100,000 horse-power, is supplying Baltimore, many miles distant, with electrical power, and may in the future supply Philadelphia. Applications of water-power in this way have become numerous and extensive in various parts of the United States and in other countries. A great concrete dam, 9096 feet in total length, is being built across the Mississippi at Keokuk, Iowa, at the foot of the Des Moines rapids, which is expected to yield 300,000 horse-power, a little more than half that obtained from the Niagara. In view of the coming wide installation of works of this character, far-seeing capitalists have made insidious efforts to gain control of the leading sources of water-power, not yet occupied, in the United States, having in view doubtless the coming replacement of steam by electricity in railroad traction. To forestall this, the government has withdrawn the important water-power sites in the West from private exploitation, reserving them for the benefit of the people at large when the time for their utilization shall arrive.

Waterproof Cloth, cloth rendered impervious to water. There are numerous processes for waterproofing fabrics of all kinds. The earliest patent, that of Macintosh (1823), consisted in covering cloth with a paste obtained by dissolving caoutchouc in benzol or coal naphtha. In the treatment of cotton and linen cloth a small proportion of sulphur is generally added. A thin layer of this rubber solution is spread on the fabric by special machinery, after which the cloth is doubled, pressed and finished in calenders, the waterproof layer being thus in the center of the finished material. Textiles thus manipulated become also impervious to air, and from a hygienic point of view unsuitable for prolonged personal wear. This led to the introduction of other solutions and methods of application intended to produce fabrics which, while resisting rain, do not altogether obstruct ventilation. Consecutive dipping of cloths in soap and alum solutions, or in gelatine and gall solutions, or in a solution of acetate of lead and then in a solution of alumina, has been resorted to with more or less success. The new substance called algin, obtained from seaweed, has been strongly recommended for the same purpose. Another recent patent process consists in treating the fibers in the solution instead of the manufactured textile, and the fabric thus produced, while rain-resisting, offers the same ventilation as ordinary materials.

Water Rabbit, an American species, most abundant in the swampy tracts bordering on the Mississippi and its tributaries in the southwestern States, whence it is also called the swamp hare. It is an excellent swimmer, and subsists chiefly on the roots of aquatic plants.

Water Rail, a bird generally distributed over America and Europe, and fairly common, though not often seen, from its shy, retired habits. It frequents marshes and bogs, and swims and dives well, but has poor powers of flight. It is a delicious bird for the table and is a favorite game bird.

Water Ram. See *Hydraulic Ram.*

Water-rat. See *Vole.*

Water-scorpion, the popular name of *Nepa*, a genus of hemipterous insects, the species of which inhabit ponds, etc. Some of them are powerful insects, 2 or 3 inches in length. They receive their popular name from the scorpion-like form of the forelegs, with which they seize their prey.

Watershed. See *Rivers.*

Waterspout, a remarkable meteorological phenomenon frequently observed at sea, and exactly analogous to the whirlwinds experienced on land. It occurs when opposite winds of different temperatures meet in the upper atmosphere, whereby a great amount of vapor is condensed into a thick black cloud, to which a vortical motion is given by the action of the opposing winds, the force of which extends downward. This vortical motion causes the cloud to take the form of a vast funnel, which, descending near the surface of the sea, draws up the water in its vortex, which joins in its whirling motion. The whole column, which after the junction extends from the sea

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to the clouds, assumes a magnificent appearance, being of a light color near its axis, but dark along the sides. When acted on by the wind the column assumes a position oblique to the horizon, but in calm weather it maintains its vertical position, while at the same time

Waterspout.

it is carried along the surface of the sea. Sometimes the upper and lower parts move with different velocities, causing the parts to separate from each other, often with a loud report. The whole of the vapor is at length absorbed in the air, or it descends to the sea in a heavy shower of rain. Sudden gusts of wind, from all points of the compass, are very common in the vicinity of waterspouts. What are sometimes called *waterspouts on land*, or *cloud-bursts*, are merely heavy falls of rain of a local character that occur generally during thunder-storms. In sandy deserts they draw up the sand as waterspouts draw up water. The tornado of the central United States is a destructive example of the whirling storms which on the ocean produce waterspouts.

Waterton, CHARLES, an English naturalist, born at Walton Hall, Wakefield, in 1782; died in 1865. He was educated at the Roman Catholic College at Stonyhurst, where he evinced a great taste for natural history. He spent many years in travel, and published *Wanderings in South America* and *Essays in Natural History*, with an *Autobiography*.

Watertown (wa'ter-town), a village of Watertown township (town), Middlesex Co., Massachusetts, on the Charles River, 7 miles W. of Boston, of which it is a residental suburb. It has a national arsenal and manufactures of paper, rubber goods, woolens, shoddy, soap, starch, etc. Pop. of town, 13,000.

Watertown, a city, capital of Jefferson Co., New York, on Black River, about 10 miles from Lake Ontario. The rapids of the river yield abundant water-power, which is utilized in extensive manufactures of paper, wood-pulp, steam engines, air-brakes, silk, etc. There is here a State armory, homes for the aged and orphans, etc. Pop. 26,730.

Watertown, a city, county seat of Coddington Co., South Dakota, 225 miles west of Minneapolis. It is the trade center of a rich farming country, and has a large wholesale and jobbing trade. Pop. 7010.

Watertown, a city of Jefferson and Dodge Cos., Wisconsin, on the Rock River, 44 miles W. by N. of Milwaukee. It is the trade center of an extensive farming region and has manufactures of machinery, bricks, flour, apiary supplies, dairy products, shoes, boxes, etc. Here is the Northwestern University (Lutheran) and the Sacred Heart College (Catholic). Pop. 8829.

Waterville, a city of Kennebec Co., Maine, on the Kennebec River, 81 miles N. N. E. of Portland. Various falls afford water-power. Here is Colby College (1820), and the Colburn Classical Institute. Manufactures include cotton and woolen goods, machinery, foundry products, furniture, shirts, etc. At Winslow, on the opposite side of the river, are large paper and pulp mills. Waterville was settled as a part of Winslow in 1764. Pop. 12,500.

Watervliet (-vlēt), a city of Albany Co., New York, on the Hudson River, opposite Troy, on the Delaware and Hudson Railroad and the Erie Canal. It has a national arsenal, car-works, foundries, woolen factories, hardware works, etc. Pop. 15,074.

Water-wheel, a wheel moved by water, as the overshot wheel, the undershot wheel, the breast-wheel and the turbine. (See these terms.)

Waterworks, the reservoirs, with their accompanying pumping machinery and distributing pipes, by which water is now supplied to cities. This process is by no means modern. We read in the Bible that King Hezekiah made a pool and a conduit and brought water into the city of Jerusalem. In the Roman Empire the bringing of water into cities by means of aqueducts was very common and many remains of the masonry aqueducts of ancient Rome still exist. The great modern cities of Europe and America owe their possible existence to copious supplies of water, brought often from considerable distances, carried in large pipes under the streets and supplied to houses by means of small pipes, a sufficient head of water being needed to drive the supply to the upper stories of houses. Water

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for this purpose is obtained from various soufces, by pumping from rivers, as in Philadelphia, from a lake, as in Chicago, and by conveyance from large reservoirs, as in New York and many other cities. The most striking example of the latter method of supply is that of New York city, which has long been supplied from the Croton reservoir, the water being conveyed through a great rock tunnel to the city. The need of a larger supply has led to the damming of Esopus and Catskill Creeks in the Catskill Mountain region, to form a lake capable of holding 130,000,000,000 gallons. Great tunnels have been made to convey the water to the city, including a number of steel pipe siphons, the most remarkable of which is one which passes under the Hudson River at the great depth of 1100 feet. The amount of water expected from this stupendous work is 500,000,000 gallons daily. The supply for the city of London has for half a century or more been in the hands of eight companies, five of which draw all their supply from the Thames, with the exception of a portion obtained from wells and springs. The East London Company obtains nearly all its supply from the river Lea, the New River Company from the Chadwell, Amwell and Lea, the Kent Company entirely from chalk wells. Meters are used and the average use of water per day per head is 25 gallons. This is greatly exceeded in some American cities, especially in the city of Philadelphia, whose citizens use (or waste) more water than those of any other city in the world. It obtains its supply from the Delaware and Schuylkill rivers, an extensive filtration plant having recently been constructed to purify the waters of these rivers. The system of purification here employed is that of slow sand filtration, but in many places coagulating chemical substances are used for the removal of impurities. A disinfecting agent now coming into wide use is hypochlorite of lime. It must be said in conclusion that the methods of purification now employed have proved very efficacious in the prevention of such epidemic diseases as cholera and typhoid fever.

Watford (wot'fŏrd), a town of England, in Hertfordshire, on the river Colne and the Grand Junction Canal. It is well built, and has large breweries, corn and paper mills. A bridge across the Colne connects it with Bushey, a residential suburb. Pop. (1911) 40,953.

Watkins (wot'kinz), a village, capital of Schuyler Co., New York, at the head of Seneca Lake, 22 miles N. by W. of Elmira. It has large salt works and brewing industries. It is notable for the deep and picturesque ravine known as Watkin's Glen, in which are numerous beautiful cascades and which attracts large numbers of visitors. Pop. 2817.

Watkin (wot'kin), Sir Edward William, railway manager, was born at Salford, England, in 1819; died in 1894. He became secretary to the Trent Valley Railway in 1845, and from that time was director or manager of several of the leading railways, especially the Southeastern. In 1861 he went to Canada in connection with the union of the Canadian provinces, and after 1864 was long a member of parliament. He was a strenuous promoter of the Channel Tunnel, and of Wembly Park Tower, designed to exceed the Eiffel Tower in height. In 1889 he acquired part of Snowden by purchase. He was a knight of several foreign orders.

Watlingstreet (wot'ling-strēt), one of the Roman military roads in Britain, running from near Dover by London, St. Alban's, Dunstable and Towcester, into North Wales, a branch also extending into Scotland. Traces of this ancient road still exist in many parts of its course and in some sections it is still in use as an important highway.

Watson (wot'son), James Craig, astronomer, born in Elgin County, Canada West, in 1838. He was graduated at the University of Michigan in 1857, and became professor of astronomy there in 1859. In 1863 he was made professor of the observatory. In 1879 he became professor of astronomy in the University of Wisconsin, and died there Nov. 23, 1880. He discovered 23 asteroids, receiving the Lalande medal of the French Academy of Sciences for discovering six of them in one year. He also discovered several comets, was a member of the eclipse expedition of 1869 and 1870, and of the transit of Venus expedition in 1874. He wrote *Theoretical Astronomy*.

Watson, John (pseudonym 'Ian Maclaren'), a clergyman and novelist of Scotch parentage, born at Manningtree, Essex, England, in 1850. Educated at Stirling and Edinburgh, he became a Presbyterian minister, and was stationed at Liverpool 1880-1905. His *Beside the Bonnie Briar Bush* made him famous as an author. This was followed by a rapid series of works. A popular preacher and lecturer, he visited the United States on lecturing tours in 1896 and in

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1907, dying during the latter tour at Mount Pleasant, Iowa.

Watson, JOHN CRITTENDEN, admiral, born at Frankfort, Kentucky, in 1842. He was graduated at the Naval Academy in 1860, and served in the navy throughout the Civil war, being master on Farragut's flagship, the *Hartford*, from 1862 to the end of the war. He took part in the battles on the Mississippi and in Mobile Bay, in the latter engagement, when Admiral Farragut had taken a position in the port mizzen rigging to observe the fight, Watson lashed him to the rigging to prevent the danger of his falling. He was made commodore in 1897, commanded the blockading squadron in the North Cuban coast in 1898, and in 1899 succeeded Dewey in command at Manila, being appointed rear-admiral. He was United States naval representative at the coronation of Edward VII in 1902. Retired August 24, 1904.

Watson, THOMAS E., politician and historian, was born in Columbia Co., Georgia, in 1856. He was elected to Congress by the Populist party in 1891, and was nominated for vice-president by this party in 1896, and for President in 1904. He became publisher of *Tom Watson's Magazine* in 1905, and in 1906 founded the *Jeffersonian Magazine* and the *Weekly Jeffersonian*. He wrote *The Story of France* and *Life of Napoleon*, popular histories; also *Life of Jefferson* and *Bethany, a Study and Story of the Old South*.

Watt (wot), JAMES, the celebrated improver of the steam engine, was born at Greenock, January 19, 1736; and died at his seat of Heathfield, Staffordshire, August 25, 1819. His father was a merchant and magistrate of Greenock, and James received a good education in its public schools. Having determined to adopt the trade of mathematical instrument maker, he went to London (1754) to learn the art, but ill health compelled him to return after only a year's apprenticeship. Shortly after his return he endeavored to establish himself in Glasgow. The corporation objecting, he was appointed in 1757 mathematical instrument maker to the university, and resided within its walls till 1763, when he removed into the town. From this time till 1774 he acted as a civil engineer — made several surveys for canals and harbors, and some of his plans were afterwards carried into execution. It was during this period that he conceived and gave shape to his improvements on the steam-engine, which have rendered his name famous. (See *Steam-Engine.*) To give his inventions practical form he associated himself in 1774 with Mathew Boulton (see *Boulton*), the firm of Boulton and Watt having their works at Soho, Birmingham. He retired from business in 1800. Watt was a fellow of the Royal Societies of London and Edinburgh, and member of the National Institute of France. He was twice married, and was survived by one son, who

James Watt.

carried on the establishment at Soho in partnership with a son of Mr. Boulton's. Besides his great improvements to the steam engine, which first rendered it effective for general industries, Watt invented or improved a variety of mechanical appliances, including a letter-copying press. He was a man of high mental powers generally, and possessed a wide and varied knowledge of literature and science.

Watt, the name of the electrical unit of activity or rate of doing work. It is measured by the product of the voltage or electromotive force of the source into the current supplied. Thus a dynamo which is yielding 30 amperes at a voltage of 100 is working with an activity of 3000 watts. The watt is equal to 0.735 foot-pound per second; so that one horse power per second is equal to 746 watts. It is customary to use the kilowatt as the practical unit. It is equal to 1000 watts or 1.2 horse power per second.

Watteau (vât-ô), JEAN ANTOINE, a French painter, born at Valenciennes of poor parents, in 1684; died at Nogent-sur-Marne, in 1721. In 1702 he went to Paris, and earned his

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bread by working for decorative painters. For many years he struggled in obscurity, but his talent once recognized he rapidly became popular and prosperous. In 1717 he was received at the Academy, and enrolled as a painter of *fêtes galantes*, that is, pleasure parties, balls, masquerades, etc., subjects in which he excelled. Lightness, elegance, and brilliancy form the chief attractions of his style.

Watterson (wat'er-sun), HENRY, journalist, born at Washington, D. C., in 1840. He edited the *Republican Banner*, Nashville, Tennessee, before and after the Civil war, and during this war served in the Confederate army. He edited the Louisville *Journal*, at Louisville, Ky., 1867-68, and after that date the *Courier-Journal*, and won the reputation of being one of the most brilliant of American journalists. He wrote *History of the Spanish-American War*, *Abraham Lincoln*, etc.

Wattle-bird (wot'l-burd), an Australian bird (*Anthochæra carunculata*) belonging to the honey-eaters, and so named from the large reddish wattles on its neck. It is about the size of a magpie, and is of bold, active habits.

Wattle-tree, a name given in Australia to several species of acacia.

Wattle-turkey, a name often given to the brush-turkey. See *Tallegalla*.

Watts (wots), GEORGE FREDERICK, an English artist, born in 1820. He first exhibited at the Royal Academy in 1837. Among his more important pictures are: *Life's Illusion* (1849), *The Window Seat* and *Sir Galahad* (1862), *Ariadne* (1863), *Esau* (1865), *Love and Death* (1877), *Time, Death, and Judgment* (1878), *Happy Warrior* (1884), *Hope* (1886), *Judgment of Paris* (1887), *The Angel of Death* (1888), and *Fata Morgana* (1889). He was one of the most subtle and powerful of portrait-painters, among his successful work in this line being portraits of Tennyson, Millais, Leighton, Cardinal Manning, Browning, etc. He was perhaps the greatest idealist in contemporary British art. He became R.A. in 1868, and in 1886 presented some of his famous pictures to the nation. He died June 1, 1904.

Watts, ISAAC, an English divine and poet, born at Southampton in 1674; died at London in 1748. In 1702 he became minister of a Dissenting congregation in the metropolis, but ill health compelled him in 1712 to relinquish his pastoral duties. His *Psalms and Hymns* give him the first rank among English hymn writers. He was the author of various other works in prose and verse.

Waukegan (wą-kē'gan), a city, capital of Lake Co., Illinois, on the W. shore of Lake Michigan, 35 miles W. by N. of Chicago. It is built on a commanding bluff, has a good harbor, and is a popular summer and health resort, having mineral waters which are largely used. There are varied manufactures, including sugar refineries, steel wire, and brass works, scales, and organ works, etc. It is the business center of a large farming district. Pop. 16,069.

Waukesha (wą-ke'shą), a town, county seat of Waukesha Co., Wisconsin, on Fox River, 17 miles west of Milwaukee. Here are numerous mineral springs, the waters of which are widely exported. There are iron, aluminum and bridge works, motor works, breweries, etc. A State industrial school for boys, and Carroll College are located here. Pop. 8740.

Wausau (wą'sa), a city, county seat of Marathon Co., Wisconsin, 42 miles N. by E. of Grand Rapids. There is a county school of agriculture and domestic science, and extensive industries, including lumber, paper, granite, veneer, flour, turpentine, shoes, leather, saw-mill machinery, etc. Pop. 18,640.

Wave (wāv), in physics, a disturbance of matter in such a way that energy is transmitted through great distances, sometimes, but not always, accompanied with a slight permanent displacement of the particles of the conveying medium. When a disturbance is produced at a point in air, waves proceed from that point as concentric spheres and carry sound to the ear of a listener. (See *Sound.*) Light is supposed to be propagated by the wave motion of the ether in a manner somewhat analogous to the propagation of sound in air. (See *Undulatory Theory.*) When waves are produced by the disturbance of a small quantity of liquid, as when a pebble is thrown into a pool, they appear to advance from the disturbed point in widening concentric circles, the height of the wave decreasing gradually as it recedes from the center; but there is no progressive motion of the liquid itself, as is shown by any body floating on its surface. The whole seems to roll onwards, but, in reality, each particle of water only oscillates with a vertical ascent and descent. Where the depth of the liquid is invariable over its extent, or sufficient to allow the oscil-

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lations to proceed unimpeded, no progressive motion takes place, each ridge or column being kept in its place by the pressure of the adjacent columns. Should, however, free oscillation be prevented, as by the shelving of the shore, the columns in the deep water are not balanced by those in the shallow parts, and they thus acquire a progressive motion towards the latter, or take the form of *breakers*, hence the waves always roll in a direction towards the shore, no matter from what point the wind may blow. The height of the wave depends in a great measure on the depth of the water in which it is produced. The waves of the ocean have been known to reach a height of 43 feet, from trough to crest. The horizontal pressure of a strong Atlantic wave has been recorded as high as 3 tons to the square foot.

Wax (waks), an unctuous-feeling substance partaking of the nature of fixed oil. It is secreted by bees, and is also an abundant vegetable production, entering into the composition of the pollen of flowers, covering the envelope of the plum and of other fruits, and, in many instances, forming a kind of varnish to the surface of leaves. Common wax is always more or less colored, and has a distinct, peculiar odor, of both of which qualities it may be deprived by exposure in thin slices to air, light, and moisture, or more speedily by the action of chlorine. At ordinary temperature wax is solid and somewhat brittle; but it may be easily cut with a knife. Its specific gravity is 0.96. At 155° Fahr. it melts, and it softens at 86°, becoming so plastic that it may be molded by the hand into any form. Wax is insoluble in water, and is only dissolved in small quantities by alcohol or ether. The principal applications of wax are to make candles and medicinal cerates; to give a polish to furniture or floors; to form a lute or cement, for which it is used by chemists; and to serve as a vehicle for colors. (See *Encaustic Painting.*) Sealing-wax is not properly a wax. See also *Candleberry, Carnauba, China Wax, Wax-palm.*

Wax, MINERAL. See *Ozokerite.*

Waxahachie, a town, capital of Ellis Co., Texas, 30 miles s. of Dallas. It has cotton, cotton-seed oil and lumber mills. Pop. 6205.

Wax-bill, a small finch, genus *Estrilda*, so called from its beak being red like wax. It is often kept in cages.

Wax Insects. See *China Wax.*

Wax-myrtle. See *Candleberry.*

Wax-painting. See *Encaustic Painting.*

Wax-palm (*Ceroxylon andicola*), a species of palm yielding a substance consisting of two-thirds resin and one-third wax, which is found on its trunk in the form of a varnish. It is a native of the Andes, towering in majestic beauty on mountains which rise many thousand feet above the level of the sea, and sometimes attaining the height of 160 feet.

Wax Tree, a genus of tropical American trees, some of the species of which yield a copious supply of yellow resinous juice, which resembles gamboge so closely that it is called American gamboge. Like gamboge, it has purgative properties.

Wax-wing (*Ampĕlis garrŭla*), an insessorial bird belonging to the dentirostral section of the order. It derives its name from the appendages attached to the secondary and tertiary quill feathers of the wings, which have the appearance of red sealing wax. An American wax-wing is the cedar-bird (which see).

Waycross (wā'kros), a town, capital of Ware Co., Georgia, 60 miles w. of Brunswick, on the Atlantic Coast Line and the Atlanta and Birmingham railroads. It has car works. and manufactures of lumber and naval stores. Pop. 14,485.

Wayland (wā'land), FRANCIS, an educator, born in New York city, in 1796. He was graduated at Union College in 1813, and was president of Brown University in 1827-1855. He was the author of many valuable works, including: *Elements of Moral Science, Elements of Political Economy, Limitations of Human Responsibility, Domestic Slavery Considered as a Scriptural Institution, Elements of Intellectual Philosophy*, etc. He died in 1865.

Wayne (wān), ANTHONY, a Revolutionary soldier, born at Easttown, Chester Co., Pennsylvania, in 1745. A surveyor in his youth, he was elected to the general assembly in 1774, and was a member of the committee of safety in 1775. In the latter year he raised a regiment and entered the army as a colonel. He served in Canada in 1776, afterwards took command of Fort Ticonderoga, and joined Washington's army in 1777 as a brigadier general. He took a leading part in the battles of

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Brandywine and Germantown, and was commended by Washington for his gallantry at Monmouth. His daring and brilliant exploit in the capture of the strong fortifications at Stony Point won him a vote of thanks from Congress. He took part in the siege of Yorktown, was a member of the constitutional convention of 1787, and as major general in 1794 gained a complete victory over the insurgent Indians in western Ohio. He died in December, 1796, on his return from the west. Although called 'Mad Anthony,' on account of his impetuous daring, he did not lack prudence and judgment, and was an able commander.

Waynesboro (wānz'bur-o), a town of Franklin Co., Pennsylvania, near South Mountain and Antietam Creek, 14 miles S. by E. of Chambersburg. It has large factories, producing engines, boilers, agricultural implements, machinery, etc. Also stocking and shirt factories, vise works, etc. Copper, iron and oil are found in its vicinity. Pop. 7199.

Wazan, or WEZZAN, an inland town of Morocco, picturesquely situated on the northern slope of a two-peaked mountain, 90 miles S. E. of Tangier. It is a sacred city and a place of pilgrimage, the headquarters of the Grand Shereef. The principal buildings are the great mosque and the tombs of a long line of shereefs. The trade, which is carried on chiefly in Morocco, is mostly in the hands of the Jews. Pop. about 20,000.

Wearmouth, BISHOP'S, and MONK WEARMOUTH. (See *Sunderland.*)

Weasel (wē'zl; *Mustēla vulgāris*), a digitigrade carnivorous animal, a native of almost all the temperate and cold parts of the northern hemisphere. The body is extremely slender, the head small and flattened, the neck long, the legs short. It feeds on mice, rats, moles and small birds, and is often useful as a destroyer of vermin in ricks, barns and granaries. The polecat, ferret, ermine and sable are akin. The weasel, like the related species, is very courageous, and is marked by agility and wariness and pertinaceous blood-thirst. It is very persevering in hunting, keen in scent and in sight, bites severely and has a disagreeable smell. It usually sleeps during the day, and is most active at night. The fur is sometimes used, but the animal is too small to have any commercial importance.

Weather (weth'er). See *Meteorology.*

Weather Bureau, a bureau of observation founded in 1870 by the United States Government its purpose being to make daily observations of the state of the weather in all parts of the country, to collate the information thus obtained, and to calculate from the results a forecast for each of various defined districts, these being published so that the people of each district may know in advance the kind of weather likely to occur. While of importance to the agriculturist, these forecasts are frequently of still more importance to ship masters, storm warnings being given that may keep them in port when storms are imminent and thus save their ships from danger of injury or shipwreck. This system has made great progress since its institution, and reports are now received daily from more than 3500 land stations and about 50 foreign stations, while by means of wireless telegraphy some 2000 ships send reports of the weather conditions at sea. Study of results has led to the conception that more than 80 per cent. of winds and storms follow beaten paths, their movements being governed by physical conditions, a knowledge of which enables the bureau officials to estimate very closely their probable speed and direction and send warnings of their coming in advance. These forecasts cover the weather probabilities for 24 to 48 hours in advance and at times embrace general indications for a week. The forecasts are based upon simultaneous observations of local weather conditions taken daily at 8 o'clock in the morning and 8 o'clock in the evening, Eastern time, at about 200 regular stations in the United States and the West Indies, and from reports received daily from various other American localities. The results of these observations are telegraphed to Washington, where they are charted for study and interpretation by experts. These telegraphic reports in their complete form include data regarding the temperature, atmospheric pressure, precipitation of rain, wind direction, wind velocity, general weather conditions, and the kind, amount and direction of movement of the clouds. From these data, associated with those of preceding reports, the forecaster is able to trace the path of a storm area from its first appearance and to form an approximate decision as to its probable future course. In addition to the forecast center at Washington, there are others at Chicago, New Orleans, Denver, San Francisco and Portland, Oregon, the results of which

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are sent to the surrounding areas. Within two hours after the morning observations, the forecasts are telegraphed to more than 2300 principal distributing points, whence they are further sent out by mail, telegraph and telephone, being mailed daily to 135,000 addresses and received by nearly 4,000,000 telephone subscribers. Maps of wind and weather conditions are printed and distributed, and other means of disseminating the information are taken. One of the most valuable services rendered is that of the warnings of cyclonic storms for the benefit of marine interests. These are displayed at nearly 300 points on the ocean and lake coasts, including all important ports and harbors, warnings of coming storms being received from 12 to 24 hours in advance. The result has been the saving of vast amounts of maritime property, estimated at many millions of dollars yearly. For storm signals, flags of different colors and markings are displayed, each signifying some special condition of wind and weather likely to occur. Agriculturists also derive great advantage from these warnings, especially those engaged in the production of fruits, vegetables and other market garden products. Warnings of frosts and of freezing weather have enabled the growers of such products to protect and save large quantities of valuable plants. It is said that on a single night in a small district in Florida, fruits and vegetables were thus saved to the value of more than $100,000. In addition, live stock of great value has been saved by warnings a week in advance of the coming of a flood in the Mississippi; railroad companies take advantage of the forecasts for the preservation, in their shipping business, of products likely to be injured by extremes of heat or cold, and in various other ways the forecasts are of commercial, or other value. Similar bureaus have been established in other countries and progress is being made towards an international study of the weather. In this, observations made in the arctic and antarctic regions may hereafter become of utility. One of the chief stations for observations is that at Mount Weather, in the Blue Ridge Mountains of Virginia. This is equipped with delicate instruments in considerable variety for the study of the varying conditions of the upper air. Kites and captive balloons are sent up every favorable day, ascending to heights of two or more miles, and equipped with self-registering instruments to record the temperature and other conditions of the atmosphere. At other times free balloons are liberated, carrying sets of automatic registering instruments. Some of these travel hundreds of miles, but nearly all are eventually found and returned.

Weatherford, a city, county seat of Parker Co., Texas, 31 miles w. of Fort Worth. It has several collegiate institutions, and cotton and other manufactures. Pop. 6500.

Weaver-bird (wē'vr), a name given to birds of various genera, belonging to the Fringillidæ or finches. They are so-called from the remarkable structure of their nests, which are woven in a wonderful manner of various vegetable substances. Some species build their nests separate and singly, and hang them from slender

Yellow-crowned Weaver and Nest (*P. icterocephălus*).

branches of trees and shrubs; but others build in companies, numerous nests suspended from the branches of a tree being under one roof, though each one forms a separate compartment and has a separate entrance. They are natives of the warmer parts of Asia, of Africa, and of Australia. The *Ploceus icterocephălus*, or yellow-crowned weaver, is a native of South Africa.

Weaver, James B., lawyer, born at Dayton, Ohio, in 1833. He served in the Union army during the Civil war, becoming a brigadier general of volunteers. Subsequently he practiced law in Iowa; filled several public offices; edited the *Iowa Tribune;* was a member of Congress 1870-81, and 1885-89; was the Greenback candidate for President in 1880; and in 1892 the candidate of the

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Populist party, receiving 22 electoral votes. He was mayor of Colfax, Iowa, in 1904-06. He died February 6, 1912.

Weaving (wēv'ing), the art of interlacing yarn threads or other filaments by means of a loom, so as to form a web of cloth or other woven fabric. In this process two sets of threads are employed, which traverse the web at right angles to each other. The first set extends from the end of the web in parallel lines, and is commonly called the *warp;* while the other set of threads crosses and interlaces with the warp from side to side of the web, and is generally called the *weft* or *woof*. In all forms of weaving the warp-threads are first set up in the loom, and then the weft threads are worked into the warp, to and fro, by means of a *shuttle*. It was by this fundamental process of lacing two sets of threads in looms of simple mechanism that the mummy cloths of Egypt, the fine damask and tapestries of the Greeks and Romans, the Indian muslins, the shawls of Cashmere, and the famed textile fabrics of Italy and the Netherlands were produced. From the latter countries weaving by means of a hand-loom was introduced into England. This loom, in its latest form, consists of a frame of four upright posts braced together by cross-beams, the center beam at the back being the warp beam, the beam in front being that upon which the web is wound, while just below this, in front, is the breast-beam for the support of the weaver at his work. At the top of the loom is an apparatus by which the *heddles* are lifted or lowered by means of *treadles* under the foot of the weaver. These heddles consist of two frames, from which depend cords attached by a loop or eye to each thread in the warp. As these threads are attached to the frames, alternately, it follows that when one heddle is raised every second thread in the warp is also raised, while the remaining threads are depressed; and this is called *shedding the warp*. When the warp threads are thus parted there is left a small opening or shed between the threads, and it is through this opening that the weaver drives his shuttle from side to side. The shuttle, which is hollow in the middle, contains the weft-thread wound round a bobbin or pirn, and as the shuttle is shot across the web this weft thread unwinds itself. When the thread is thus introduced it is necessary to bring it to its place in the fabric. This is accomplished by means of the *lay* or *batten*, which is suspended from the top of the loom, and works to and fro like a pendulum by an attachment of vertical rods at each side called the swords. Attached to the lay is what is called the *reed*, which is a sort of comb having a tooth raised between every two threads of the warp, and so by driving up the lay after a weft thread has been introduced the weaver strikes home that thread to its place in the cloth. A great improvement was made upon the hand-loom when John Kay, about 1740, invented the fly-shuttle, as it was called. This enabled the weaver to drive the shuttle both ways with the right hand by means of a cord attached to a box or trough placed at each end of the shuttle-race, which impelled the shuttle to and fro at each jerk of the cord. But the most important improvement was made on the hand-loom by Joseph Jacquard, of Lyons, who, in 1801, invented an apparatus by which the most intricate patterns could be woven as readily as plain cloth. This is accomplished by an ingenious arrangement of hooks and wires, by means of which the warp threads are lifted in any order and to any extent necessary to make the shedding required by the pattern. The order in which these hooks and wires are successively lifted and lowered is determined by means of a series of pasteboard cards punctured with holes corresponding to a certain pattern and the cards passing successively over a cylinder or drum. The hooked wires pass through these holes and lift the warp-threads in an order which secures that the arranged pattern is woven into the fabric. When the pattern is extensive the machine may be provided with as many as 1000 hooks and wires. Another development was made in the art of weaving by the invention of the power-loom by the Rev. E. Cartwright in 1784. In the power-loom, which has been gradually improved and adapted to steam-power, the principal motions of the old method of weaving, such as shedding the warp-threads, throwing the shuttle, and beating up the thread, are still retained. The frame of the power-loom is of cast-iron, and motion is communicated to the loom by means of a shaft, the stroke of the lay being made by cranks attached to the driving shaft, while the shuttle is thrown by means of a lever attachment at the center of the loom. Although the principle of the loom is the same in all kinds of weaving, yet there are numberless modifications for the production of special fabrics. The lappet loom is one suitable for weaving either plain or gauze cloths,

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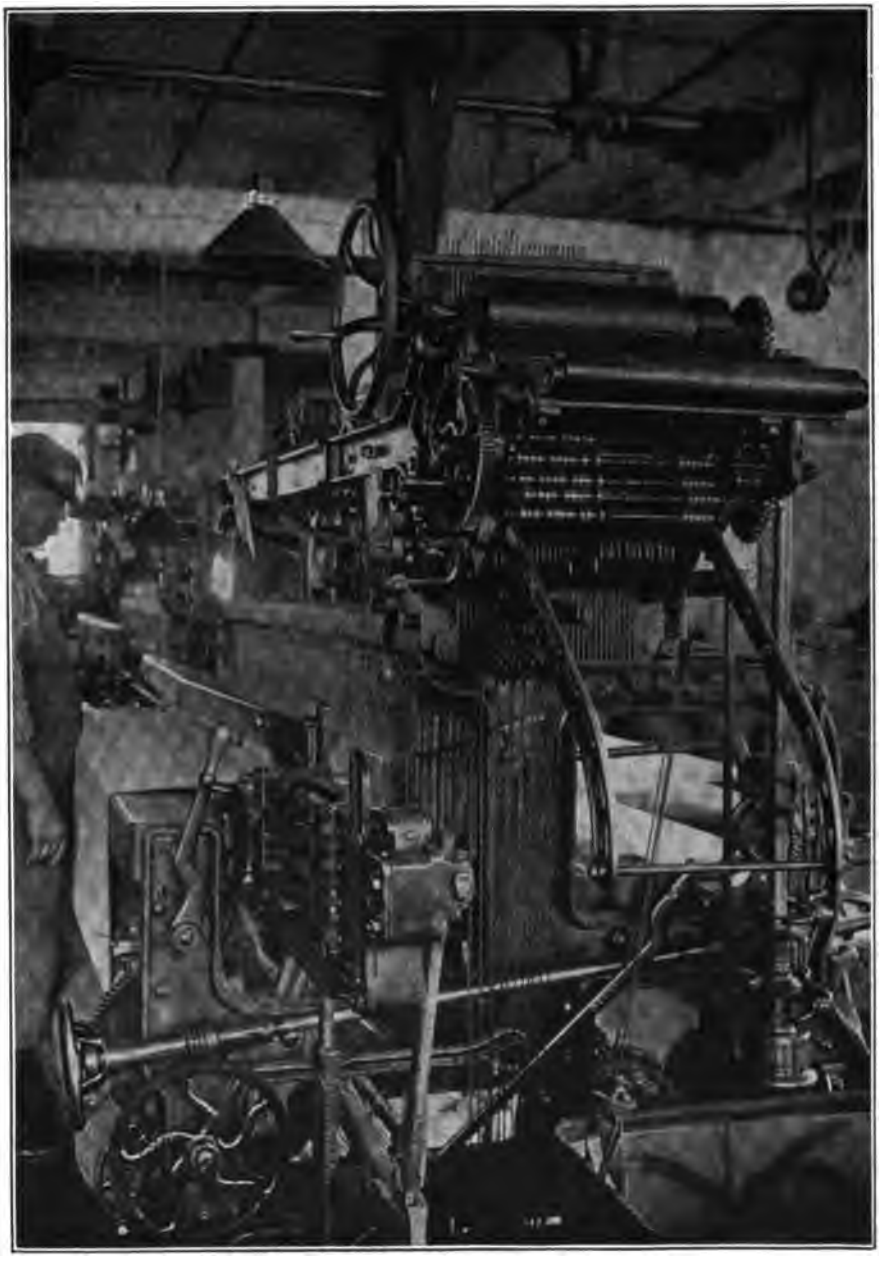

A MODERN HIGH SPEED POWER LOOM

This wonderful machine is capable of turning out beautiful and intricate fabrics with great rapidity and is almost entirely automatic in its action.

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and also for putting in representations of flowers, birds, or the like. *Cross* weaving is a term applied to that process in which, as in gauze weaving, the warp threads, instead of lying constantly parallel, cross over or twist around one another, thus forming a plexus or interlacing independent of that produced by the weft. *Double* weaving consists in weaving two webs simultaneously one above the other, and interweaving the two at intervals so as to form a double cloth. Kidderminster or Scotch carpeting is the chief example of this process. *Pile* weaving is the process by which fabrics like that of velvets, velveteens, corduroy, and Turkey carpets are produced. In the weaving of these fabrics, besides the ordinary warp and weft, there is what is called the pile-warp, the threads of which are left in loops above the surface till cut, and the cutting of which constitutes the pile.

Webb City, a city of Jasper Co., Missouri, 5 miles N. W. of Joplin. It is the center of a lead and zinc region, and has large mining interests. Has also a foundry, iron works, etc. Pop. 11,817.

Webb, CHARLES HENRY, humorist, born at Rouse's Point, New York, in 1834; died in 1905. Under the pen name of 'John Paul' he wrote for several newspapers, his humorous sketches being chiefly contributed to the New York *Tribune.* He wrote several burlesque dramas.

Weber (vā'bėr), KARL MARIA FRIEDRICH ERNST, BARON VON, a German musical composer, was born at Eutin in Holstein in 1786. His father was a musician and had him carefully educated. In 1800 he wrote the opera of the *Waldmädchen* ('Wood-maiden'), and had it performed at Chemnitz and Freiberg in Saxony. In 1803 he visited Vienna, where he became acquainted with Haydn and the Abbé Vogler, from whom he received great help in his studies. The latter procured him a musical directorship in Breslau, on which he entered in 1804. Two years later he exchanged this post for a similar one at Carlsruhe, and he was subsequently (1813-16) director of the opera at Prague. At the close of 1816 he settled at Dresden, where he was founder and director of the German opera. In 1820 he went to Berlin to bring out *Der Freischütz,* the most celebrated of his compositions. It was performed in London and Paris two years later. In 1822 *Euryanthe* was produced on commission for Vienna, and was brought out there in August, 1823. In 1826 Weber visited London to superintend the production of *Oberon* at Covent Garden Theater. It was enthusiastically received. The composer, however, was out of health, and died in London, June 5, 1826. Besides operas, he wrote a large number of other works.

Webster (web'ster), a village in Webster township (town), Worcester Co., Massachusetts, on the French River, 16 miles S. by W. of Worcester. It has extensive manufactures of cotton and woolen goods, boots and shoes, optical goods, etc. The lake is a summer resort. Pop. 11,509.

Webster, city in Hamilton Co., Iowa, on the Boone River, 20 miles E. of Fort Dodge. It has railroad shops and various manufactures. Pop. 5208.

Webster, DANIEL, famous orator and statesman, born January 18, 1782, at Salisbury, New Hampshire. He studied for four years at Dartmouth College, and having adopted the legal profession was admitted as a practitioner in the Court of Common Pleas for Suffolk county. In 1813 he was elected to Congress by the Federal party in New Hampshire, and from that period to the close of his life took a

Daniel Webster.

prominent part in public affairs, being especially distinguished as an orator. No public speaker could surpass him in producing an impression on an audience, and he is regarded as one of the greatest of the world's orators. He became a senator in 1827, and in 1836 (and again in 1848) was an unsuccessful candidate for the presidency. In 1841, under the presidency of General Harrison, he was appointed secretary of state, and he had an important part in the arrangement of the Ashburton Treaty of 1842. He

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was opposed to the admission of Texas as a slave state and to the Mexican war, but supported Clay's 'compromise' of 1850. In 1850, on the death of President Taylor, he became secretary of state under President Fillmore. This office he continued to occupy till his death, which took place at his estate of Marshfield, Massachusetts, October 24, 1852. Among his many notable orations the most famous was that called out by the nullification movement of South Carolina in 1830. His great argument in defense of the Union and the Constitution on that occasion has rarely or never been surpassed in the history of oratory. Its closing sentence, 'Liberty and Union, now and forever, one and inseparable,' has become an American watchword.

Webster Groves, a city of St. Louis Co., Missouri, 10 miles w. s. w. of the central point of St. Louis, to which it is closely related. Pop. 7080.

Webster, JOHN, a dramatic poet of the seventeenth century, was clerk of the parish of St. Andrew, Holborn, and a member of the Company of Merchant Tailors. His works are: The *White Devil* (1612); *The Devil's Law-case* (1623); *The Duchess of Malfy* (1623); *Appius and Virginia* (1654); *The Thracian Wonder* (1661); and *A Cure for a Cuckold*, a comedy (1661). He also assisted Dekker in writing the *History of Sir Thomas Wyatt*, and the comedies *Westward Ho!* and *Northward Ho!* By some critics he is accounted second only to Shakespeare.

Webster, NOAH, lexicographer, was born at West Hartford, Connecticut, in 1758, and educated at Yale College. He chose the law as a profession, but relinquished it for teaching (1782). About the same time he began the compilation of books of school instruction, and published his *Grammatical Institute of the English Language*, in three parts: Part 1, *Webster's Spelling Book;* Part 2, *A Plain and Comprehensive Grammar;* Part 3, *An American Selection of Lessons in Reading and Speaking.* All these works had an enormous sale. His literary activity was henceforth very great, the works issued by him during the next few years including important legal and linguistic studies. In 1789 he settled at Hartford to practice law, but removed in 1793 to New York, where for some time he devoted himself to journalism. In 1806 he published an 8vo *English Dictionary*, which led the way for his great work, the *American Dictionary of the English Language.* In preparing this work he visited England, and finished the dictionary during an eight months' residence in Cambridge. The first edition of his dictionary was published in 1828 (2 vols. 4to); it was followed by a second in 1840; since which time several enlarged and improved editions have appeared. He died in May, 1843.

Wedge (wedj), a piece of wood or metal, thick at one end, and sloping to a thin edge at the other, used in splitting wood, rocks, etc. In geometrical terms it is a body contained under two triangular and three rectangular surfaces. It is one of the mechanical powers, and besides being used for splitting purposes is employed for producing great pressure, and for raising immense weights. All that is known with certainty respecting the theory of the wedge is that its mechanical power is increased by diminishing the angle of penetration. All cutting and penetrating instruments may be considered as wedges.

Wedgwood (wedj'wŭd), JOSIAH, a celebrated potter, born at Burslem, Staffordshire, England, in 1730. He received little education, and went to work in his brother's factory at the age of eleven. An incurable lameness, the result of smallpox, which subsequently compelled him to have his right leg amputated, forced him to give up the potter's wheel. He removed for a time to Stoke, where he entered into partnership with persons in his own trade, and where his talent for ornamental pottery was first displayed. Returning in 1759 to Burslem, he set up a small manufactory of his own, in which he made a variety of fancy articles. His business improving, he turned his attention to white stoneware, and to the cream-colored ware for which he became famous; and he succeeded in producing a ware so hard and durable as to render works of art produced in it almost indestructible. His reproduction of the Portland Vase is famous. He also executed paintings on pottery without the artificial gloss so detrimental to the effect of superior work. (See *Wedgwood-ware.*) His improvements in pottery created the great trade of the Staffordshire Potteries. He died in 1795. See *Pottery.*

Wedgwood-ware, a superior kind of semivitrified pottery, without much superficial glaze, and capable of taking on the most brilliant and delicate colors produced by fused metallic oxides and ochers; a

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named after the inventor. It is much used for ornamental ware, as vases, etc., and, owing to its hardness and property of resisting the action of all corrosive substances, for laboratory mortars.

Wednesbury (wenz'ber-i), a parliamentary borough of England, in Staffordshire, 19 miles S. S. E. of Stafford, in the district known as the Black Country, and an important seat of wrought-iron manufactures. It has an ancient church. Pop. 28,108.

Wednesday (wenz'dā), the name of the fourth day of the week (in Latin, *dies Mercurii*, day of Mercury), derived from the old Scandinavian deity Odin or Woden.

Weed (wēd), THURLOW, journalist, born at Cairo, New York, in 1797; died November 22, 1882. He served as a private in the war of 1812, afterwards engaged in newspaper work, and in 1820 founded the Albany *Evening Journal*, which became the organ of the Whig party, and which he controlled for 35 years. He was a leader in state and national politics, but declined all offices for himself. He supported Lincoln and the Civil war, and was sent by the President on a mission to Europe in 1861-62. He wrote *Letters from Europe and the West Indies, Reminiscences*, and *Autobiography*.

Weed, a name applied to uncultivated plants growing wild or contaminating cultivated ground. Many are useful.

Week (wēk), a period of seven days, one of the common divisions of time, the origin of which is doubtful. Among the nations who adopted the week as a division of time, the Chinese, Hindus, Egyptians, Chaldeans, Jews, Persians, and Peruvians have been mentioned, but in some cases the antiquity of the practice is doubtful, and in others the name has been applied to other cycles than that of seven days. The nations with whom the weekly cycle has been traced with certainty to the greatest antiquity are the Egyptians and the Hebrews. With the former we only know of its existence, but with the latter it had a much more important character. The use of the week was introduced into the Roman Empire about the first or second century of the Christian era from Egypt, and had been recognized independently of Christianity before the Emperor Constantine confirmed it by enjoining the observance of the Christian Sabbath. With the Mohammedans the week has also a religious character, Friday being observed by them as a Sabbath.

Weeks, FEAST OF. See *Pentecost.*

Weeper-monkey, or SAI. See *Sapajou.*

Weeping-ash, *Fraxinus pendŭla*, a variety of ash differing from the common ash only in its branches arching downwards instead of upwards.

Weeping-birch, a variety of the birch-tree, known as *Betŭla pendŭla*, with drooping branches, common in different parts of Europe.

Weeping-willow, a species of willow, the *Salix Babylonica*, whose branches grow very long and slender, and hang down nearly in a perpendicular direction. It is a native of the Levant, but has been introduced into the United States and other countries.

Weerd, or WEERT (vārt), a town of Holland, in the province of Limburg. Pop. 8677.

Weever (wē'ver), a name of several acanthopterygious fishes of the genus *Trachinus*, included by many authorities among the perches. Two species are found in the Atlantic, viz. the dragon-weever, sea-cat, or sting-bull, *T. draco*, about 10 or 12 inches long, and the lesser weever, *T. vipĕra*, called also the adder-pike, or sting-fish, which attains a length of 5 inches. They inflict wounds with the spines of their first dorsal fin, which are much dreaded. Their flesh is esteemed.

Weevil (wē'vil), the name applied to beetles of the family Curculionidæ, distinguished by the prolongation of the head, so as to form a sort of snout or proboscis. Many of the weevils are dangerous enemies to the agriculturist, destroying grain, fruit, flowers, leaves, and stems. The larvæ of the corn-weevil (*Calandra granaria*) is very destructive to grain, that of the pea-weevil (*Bruchus pisi*) to peas. See *Corn-weevil* and *Pea-beetle.*

Corn-weevil (*Calandra granaria*). *a*, Insect natural size. *b*, Insect magnified. *c*, Larva, *d*, Egg (both magnified).

Weft. See *Weaving.*

Weigelia (wī-gē'li-a), a genus of shrubs of the order Caprifoliaceæ (honeysuckles), natives of China and Japan, now cultivated in gardens for the beauty of their flowers.

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Weighing Machine. See *Balance.*

Weight (wāt), the measure of the force by which any body, or a given portion of any substance, gravitates or is attracted to the earth; in a more popular sense, the quantity of matter in a body as estimated by the balance, or expressed numerically with reference to some standard unit. In determining weight in cases where very great precision is desired, due account must be taken of temperature, elevation, and latitude. Hence in fixing exact standards of weight a particular temperature and pressure of air must be specified; thus the standard brass pound is directed to be used when the Fahrenheit thermometer stands at 62° and the barometer at 30°. See also *Gravity*, and next article.

Weights and Measures, the standard used in accurately weighing and measuring quantities, of especial importance in buying and selling, scientific operations, etc. The origin of the English measures is the grain of corn. Thirty-two grains of wheat, well dried, and gathered from the middle of the ear, were to make what was called one pennyweight; 20 pennyweights were called one ounce; and 20 ounces, one pound. Subsequently, it was thought better to divide the pennyweight into 24 equal parts, to be called *grains*. William the Conqueror introduced into England what was called *troy weight* (which see). The English were dissatisfied with this weight, because the pound did not weigh so much as the pound at that time in use in England; consequently a mean weight was established, making the pound equal to 16 ounces. (See *Avoirdupois.*) But the troy pound was not entirely displaced by the pound avoirdupois; on the contrary it was retained in medical practice, and for the weighing of gold, silver, jewels, and such liquors as were sold by weight. There are 7000 grains in one pound avoirdupois, and 5760 grains in one pound troy; hence the troy pound is to the avoirdupois pound as 14 to 17, or as 1 to 1.215. The troy pound was retained as the British standard by an act passed in 1824; and in order that the standard pound, in case of damage or destruction, might be restored, by reference to a natural standard, it was ascertained that a cubic inch of distilled water, at a temperature of 62° Fahr., weighed, in air, 252.458 grains; and it was directed that the standard pound should be restored by the making of a new standard troy pound, weighing 5760 of such grains. In Britain the unit of lineal measure is the yard, all other denominations being either multiples or aliquot parts of the yard. The length of the imperial standard yard, according to the act of parliament passed in 1824, was the straight line or distance between the centers of the two points in the gold studs in the brass rod in the custody of the clerk of the House of Commons, entitled, *standard* yard, 1760. By the same act, the brass rod, when used, must be at the temperature of 62° of Fahrenheit's thermometer. It was enacted at this time that if this standard should be lost or destroyed, the length of the yard should be determined by reference to the length of a pendulum vibrating seconds of mean time in a vacuum in the latitude of London, at sea-level. When the standard yard was actually destroyed, however, by the fire which consumed the two Houses of Parliament in 1834, the commissioners appointed to restore the standard decided that it was better to do so by means of authentic copies of the old standard that were in existence. This was accordingly done, and five new official copies were made, one of which, to be regarded as the national standard, is preserved at the exchequer in a stone coffin in a window-seat of a groined room. The national standard yard is thus the distance between two fine transverse lines on a square rod of gun-metal 38 inches long. In France the *mètre* is the standard or unit of linear measure; the *are*, or 100 square mètres, the unit of surface measure; and the *stère*, or cube of a mètre, the unit of solid measure. The system of measure, called the *decimal* or *metric* system, based upon these standards, is now largely adopted. For all sorts of liquids, corn, and dry goods, the British standard measure is declared by the act of 1824 to be the imperial gallon, which should contain 10 lbs. avoirdupois weight of distilled water weighed in air at the temperature of 62° Fahr., the barometer being at 30 inches. The official measurement of this quantity of water measured under the specified conditions gave as the result 277.274 cubic inches, which, though since ascertained to be slightly in excess of the true measurement (277.123 cubic inches), is still the legal capacity of the gallon. The United States has adopted the weights and measures prevalent in Britain and the two countries are alike in this respect. Prior to 1824 there existed a bewildering irregularity in the weights and measures used, but

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since then they have been in great measure regulated by statute, and entire uniformity has been introduced. By the statutes the imperial standard yard, pound, and gallon are fixed, and all local measures of capacity abolished. The legal stone is fixed at 14 lbs. avoirdupois. All articles sold by weight must be sold by avoirdupois, except gold, silver, platinum, and precious stones, which, as noted above, are still to be sold by troy weight. While the system described is in common use in all English-speaking countries, the French metrical system has extended widely beyond the borders of France, and is now in use to some extent in nearly all civilized countries. In the United States and Great Britain it is largely used in scientific measurement. Besides the articles on *Avoirdupois*, *Troy Weight*, etc., see *Ounce*, *Pound*, *Bushel*, *Decimal System*, etc.

Wei-hai-wei (wā-hī-wā'), a small territory in the province of Shantung, China, extending 16 miles along the bay of the same name; area about 285 sq. miles; pop. about 150,000. A Chinese fleet was destroyed in the bay during the war with Japan in 1895. The territory, with the walled city of Wei-hai-wei, was leased to Great Britain by China in 1898.

Weimar (vī'mär), the capital of the grand-duchy of Saxe-Weimar, stands on the left bank of the Ilm, and in a beautiful valley surrounded by hills, but is not well built, and notwithstanding the presence of the court has a dull and lifeless appearance. Its public edifices most deserving of notice are the ducal palace, the so-called Red and Yellow Castles, now united and occupied by several public departments; the public library, containing an extensive collection; the museum; the theater; the Stadtkirche, with an altar-piece, one of the finest works of Lucas Cranach. Weimar is closely associated with the names of Schiller, Goethe, Herder, and Wieland, the first three of whom are buried here, and statues to all the four adorn the town. The houses of Goethe, Schiller, Cranach, and Herder are also objects of much interest. Pop. (1910) 34,582.

Weimar, Saxe. See *Saxe-Weimar*.

Weinheim (vīn'hĭm), a town in South Germany, in Baden, on the Weschnitz, 10 miles N. of Mannheim, with manufactures of machinery, silks, woolens, etc. Pop. 12,560.

Weir, (wēr), a dam erected across a river to stop and raise the water, either for the purpose of taking fish, of conveying a stream to a mill, or of maintaining the water at the level required for navigating it, or for purposes of irrigation.

Weir, Harrison, an English artist, was born at Lewes, Sussex, in 1824, and educated at an academy in Camberwell. Having learned the trade of a wood-engraver he turned his attention to painting. His first exhibited picture was in oil, entitled *The Dead Shot*. In 1847 he was elected a member of the new Society of Painters in Water Colors. He became chiefly noted for his pictures of country life, animals, fruits, flowers, and landscapes. As an illustrator of books and periodicals he is well known. He was the author of *The Poetry of Nature; Everyday Life in the Country; Animal Stories; Old and New;* and *The Cat*. He died Jan. 4, 1906.

Weismann (vīs'man), August, biologist, was born at Frankfort-on-the-Main in 1834; studied medicine, and in 1860 became physician to the Archduke Stephen of Austria. He attracted great attention by his *Essays on Heredity* (translated 1892), in which he denied hereditary transmission of other than race characters. With this he advanced a theory of generation that was accepted by many biologists. Others strongly opposed it and it was sustained by him in several volumes. It is known in biology as Weismannism. It maintains that the nucleus of every germ cell contains a *germ-plasm* which is not derived from the body, but is transmitted from germ to germ. Thus it is unaffected by the hereditary characteristics of the body, but contains and reproduces those of the race only. Biological science is divided between the friends and foes of this unproved hypothesis.

Weissenburg (vī'sĕn-bŭrĸ), a town of Germany, in the province of Alsace-Lorraine, at the foot of the Vosges Mountains, on the Lauter, 34 miles N. N. E. of Strasburg. In the Franco-German war of 1870-71 a battle took place at Weissenburg on Aug. 4, 1870, the first important engagement between the two armies, in which the French were defeated. Pop. 6946.

Weissenfels (vī'sĕn-fels), a town of Prussia, in the government of Merseburg, in the province of Saxony, on the Saale, with manufactures of porcelain, shoes, woolen fabrics, gold and silver articles, etc. It has a church containing the remains of Gustavus Adolphus. Pop. 30,894.

Weld. See *Dyer's-weed*.

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Welding (weld'ing), the union produced between the surfaces of pieces of malleable metal when heated almost to fusion and hammered.

Welland, a town of Ontario, Canada, on Welland Canal, 12 miles s. of St. Catharines. Pop. 6500. The canal, opened in 1829, affords navigation around the Niagara falls and rapids; is 26¾ miles in length and by means of 26 locks rises 326¾ feet.

Welles (welz), GIDEON, an American naval officer and political leader, born in Glastonbury, Conn., July 1, 1802. He studied law and in 1826 became editor and proprietor of the Hartford Times, favoring Andrew Jackson's election to the presidency. From 1827 to 1835 he was a member of the Connecticut legislature. He became identified with the Republican party in 1857, and was chairman of the Connecticut delegation in the Convention that nominated Lincoln. He was secretary of the navy, 1861–69. He died February 11, 1878.

Welles, THOMAS, colonial governor, born in England 1598; came to America about 1636, and settled in Hartford, Conn. He was commissioner of the United Colonies in 1649 and 1654, and governor in 1655 and 1658.

Wellesley, a town of Norfolk county, Massachusetts, 15 miles w. by s. of Boston. It is the seat of Wellesley College, founded in 1875, for the higher education of women, which in 1913 had an enrollment of 1480 students, 133 instructors and a library of 74,000 volumes. Pop. of town 5413.

Wellesley, PROVINCE OF. See *Penang.*

Wellesley (welz'li), RICHARD COLLEY WESLEY, MARQUESS, eldest brother of the Duke of Wellington, was born at Dublin in 1760. He was appointed governor-general of India in 1797. He became lord-lieutenant of Ireland, in 1821. He resigned in 1828, but in the Grey ministry he again became lord-lieutenant of Ireland (1833–35). He died in 1842.

Wellhausen (vel'how-sen), JULIUS, a distinguished German theologian and critic, born 1844. Among his works are *Text der Bücher Samuelis, Die Pharisäer und Sadducäer.*

Welfare Work, the term applied to various activities undertaken by large corporations and other employers for the benefit of their employes. These range from lunch rooms and locker rooms to extensive medical and sanitary systems, and the provisions for old age pensions, compensation for industrial accidents, etc.

Wellingborough (wel'ing-bur-ō), a town of Northamptonshire, on the river Nen, 10 miles northeast of Northampton. It has a handsome parish church, a grammar school, and a corn exchange, accommodating also a literary institute. The principal industries are the manufacture of boots and shoes, and the smelting of iron. Pop. 19,758.

Wellington, a city, county seat of Sumner Co., Kansas, on Slate Creek, 30 miles s. by w. of Wichita. It has flour mills and grain elevators, and is the division point for the Santa Fé Railroad. Pop. 7034.

Wellington (wel'ing-tun), a town of England, in Shropshire, 11 miles east of Shrewsbury, with manufactures of nails, farm implements, brass and iron ware, etc. Pop. 7820.

Wellington, a town of England, in Somerset, with manufactures of druggets and serges. From this place the Duke of Wellington took his title. Pop. 7634.

Wellington, the capital of New Zealand, is situated on Port Nicholson, an islet of Cook's Strait, on the southwest extremity of the provincial district of Wellington, North Island. Its harbor is 6 miles long and 5 wide. It has two wharfs and a patent slip. The principal buildings are the Government House, the Houses of Legislature, the Government Buildings, Wellington College, a Roman Catholic college, etc. It has several daily and weekly newspapers, botanic gardens, tramways, etc., and is lighted by electricity. Pop. 64,372.—The provincial district of Wellington has an area of 11,250 sq. miles. It has an equable and healthy climate, but is subject to earthquake shocks. It is intersected by several mountain ranges, but there are many fine agricultural and pastoral districts. Gold was found in 1881. The chief rivers are the Manawatu and Wanganui.

Wellington, ARTHUR WELLESLEY, DUKE OF, born in 1769, was the third son of the first Earl of Mornington, and was educated at Eton, at Brighton, and finally at the Military College of Angers. In 1787 he received a commission as ensign in the 73d Foot, and after a rapid series of changes and promotions, attained by purchase in 1793 the command as lieutenant-colonel of the 33d Regiment. During 1794 and 1795 he served with his regiment under the Duke of York in Flanders. In 1796 his regiment was despatched to Bengal, Colonel Wellesley landing at Calcutta in Feb., 1797, at a critical moment for the

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British power in India. War had just been declared against Tippoo Saib, and an army of 80,000, of which Colonel Wellesley's regiment formed part, marched against him. An engagement took place at Mallavelly (Mysore) on the 27th, in which Wellesley, who commanded the left wing, turned the right of the enemy. He was subsequently employed to dislodge the enemy from their posts in front of Seringapatam, and after the capture of that capital he was appointed, in 1799, to the administration of Mysore, his brother being at this time governor-general. (See *Wellesley.*) In 1802 he attained the rank of major-general, and in the following year he was appointed to the command of a force destined to restore the Peishwa of the Mahrattas, driven from his capital by Holkar. After this operation had been successfully performed the other Mahratta chiefs, Scindia and the Rajah of Berar, showed hostile designs against the British, and Wellesley was appointed to the chief military and political command in the operations against them. After an active campaign, in which he took Ahmednuggur and Arungabad, he encountered a powerful Mahratta army, assisted by French officers, at Assaye, on September 23, and entirely defeated it. The parallel successes of General Lake, and the defeat of the Rajah of Berar by Wellesley at Argaum on November 29 compelled the submission of the Mahrattas, and peace was restored on conditions drawn up by the successful general. Early in 1805, his health failing, Wellesley obtained leave to return home, and arrived in England in September. He had before leaving Madras received his appointment as Knight Commander of the Bath. From November to February he was engaged as brigadier-general in Lord Cathcart's expedition to the continent, which was without result. In January, 1806, he succeeded Lord Cornwallis as colonel of his own regiment, the 33d. On April 10, 1806, he married Lady Catherine Pakenham, third daughter of the Earl of Longford. He was shortly afterwards elected M.P. for Rye, and in April, 1807, was appointed secretary of state for Ireland. In August he received the command of a division in the expedition to Copenhagen under Lord Cathcart and Admiral Gambier, and took Kioge on April 29, the only land operation of importance. On April 28, 1808, he attained the rank of lieutenant-general and in June received the command of a force destined to operate in the north of Spain and Portugal. He was subsequently superseded; but before giving up the command he gained the battle of Vimeira over Junot, the campaign being brought to a close with the convention of Cintra, by which the French agreed to evacuate Portugal. In 1809 Wellesley was appointed to take the chief command in the Peninsula, which had been overrun by the French. The famous passage of the Douro, and the defeat of Soult which followed, fittingly opened this masterly campaign. For the victory at Talavera (July 28), the first of a long list that subsequently took place in the Peninsula, the government raised the commander-in-chief to the peerage as Viscount Wellington. Towards the end of 1810 Wellington fought the battle of Busaco, which was followed by the famous fortification and defense of the lines of Torres Vedras. A little later (in 1811) occurred the victory of Fuentes de Onoro. In the following year he took Ciudad Rodrigo and Badajoz by storm, and fought the battle of Salamanca, accounted one of his most famous victories. On August 12, 1812, Wellington entered Madrid. For his brilliant conduct of the campaign thus far he received the thanks of parliament, was raised to the dignity of marquis, and a sum of £100,000 was voted to purchase him an estate. Next followed the battle of Vittoria (June 21, 1813), for which decisive victory Wellington was given the baton of field-marshal; then battles in the Pyrenees, the capture of San Sebastian, and the crossing of the Bidassoa into France. In 1814 the battle of Orthez was gained, and in the same year the battle of Toulouse, in which Soult's best troops were routed, and the hopes of France in the Peninsula utterly annihilated. The way was now open for the British troops to the heart of France. In six weeks, with scarcely 100,000 men, Wellington had marched 600 miles, gained two decisive battles, invested two fortresses, and driven 120,000 veteran troops from Spain. Napoleon abdicated on April 12, and a few days later the war was brought to a close by the signing of conventions with Soult and Berthier. In May the triumphant general was created Marquis of Douro and Duke of Wellington, with an annuity of £10,000, commuted afterwards for £400,000. He received the thanks of both Houses of Parliament. In July he went as ambassador to France, and succeeded Lord Castlereagh as British representative in the Congress of Vienna. In April he took the command of the army assembled in the Netherlands to oppose Napo-

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leon. (See *France* and *Waterloo.*) On his return to England after the restoration of peace he received a vote of £200,000 for the purchase of the estate of Strathfieldsaye, to be held on presenting a colored flag at Windsor on the 18th of June each year. With the return of peace he resumed the career of politics. He accepted the post of master-general of the ordnance with a seat in the cabinet of Lord Liverpool in January, 1819. In 1822 he represented Great Britain in the Congress of Vienna. In 1826 he was appointed high-constable of the Tower. On January 22, 1827, he succeeded the Duke of York as commander-in-chief of the forces. On January 8, 1828, he accepted the premiership, resigning the command of the forces to Lord Hill. In January, 1829, he was appointed governor of Dover Castle and lord warden of the Cinque Ports. In 1830 repeated motions for parliamentary reform were defeated, but the growing discontent throughout the country on this subject and a defeat in parliament caused the resignation of the government in November. His opposition to reform made the duke so unpopular that he was assaulted by a mob on June 18, 1832, and his life endangered. He accepted office under Sir Robert Peel in 1834-41, and again in 1846, when he helped to carry the repeal of the corn-laws, which till then he had opposed. In 1842 he resumed the command of the forces on the death of Lord Hill. He died at Walmer Castle, September 14, 1852.

Wellman, WALTER, journalist and explorer, was born at Mentor, Ohio, November 3, 1858. He established a weekly newspaper at the age of 14; at 21 established the Cincinnati *Evening Post*, and has been a correspondent of the Chicago *Herald* and *Record-Herald* since 1884. In 1892 he marked with a monument the supposed landing place of Columbus in Watling Island; in 1894 and 1898 headed Arctic exploring expeditions; in 1906 built a large airship at Paris, and attempted an aerial flight to the north pole in 1907 and again in 1909, both proving failures. In 1910 he attempted a flight from the United States to Europe, starting at Atlantic City, N. J. He failed in this effort, but made a flight over the ocean of 1000 miles, the greatest airship flight made to that time.

Wells (welz), a city of England, in Somersetshire, contains one of the most magnificent cathedrals in England, 415 feet long, with a transept measuring 155 feet, and three towers. Pop. 4655.

Wells, DAVID A., economist, born in Springfield, Massachusetts, in 1828. He was graduated from Williams College in 1847. Among other publications his essay on *Our Burden and Our Strength*, issued in 1864, had a large circulation. In 1867 he visited Europe, under government commission, and investigated industries competitive with those of the United States. His experience resulted in his acceptance of free-trade doctrines. He was a prolific writer of pamphlets on economic subjects. He died in 1898.

Wells, HERBERT GEORGE, a British novelist, born at Bromley, Kent, in 1866. He wrote a *Text Book of Biology* in 1893, and followed this by a series of highly imaginative stories, entitled *The Time Machine*, *The War of the Worlds*, *When the Sleeper Wakes* and various others, among the latest being *The New Machiavelli.*

Wells, HORACE, dentist, born at Hartford, Vermont, in 1815. He appears to have been the first to employ anæsthetics successfully, by inhaling nitrous oxide gas to destroy pain in dental operations. He tried it first on himself in 1844. Dr. Morton, of Boston, substituted ether for nitrous oxide in 1846. Wells lost his reason in 1848, probably as a result of inhaling chloroform, and committed suicide.

Wellston, a city of St. Louis Co., Missouri, in the vicinity of St. Louis city. Pop. 7312.

Wellston (wels'tun), a town of Jackson Co., Ohio, 32 miles S. E. of Chillicothe. There are coal mines in the vicinity, and it has iron, steel and cement works. Pop. 6875.

Wellsville (welz'vil), a city of Columbiana Co., Ohio, on the Ohio River, 48 miles W. N. W. of Pittsburgh. It has iron and tin-plate works, boiler, tanks, sewer-pipe and pottery works, etc. Pop. 7769.

Welsbach Light, an invention of Carl Auer von Welsbach, an Austrian, in 1884. In Europe it is known as the Auer light. It is based upon the discovery that certain materials become incandescent at a low temperature. The process followed is to saturate a combustible filament in the form of a network with a solution of a salt of a refractory earth, such as zirconium. It is then dried out and burned, the combustible element disappearing and leaving a frame of refractory material, which becomes incandescent at a low temperature. The filament is called a mantle and is exceedingly fragile. It gives a brilliant light

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and has come into very wide use for stores and dwellings.

Welwitschia (wel-wich'i-a), a remarkable plant growing in Southern Africa in dry regions near the western coast, between lat. 14° and 23° s. It presents a stem or rhizome forming a woody mass rising to a foot at most above the ground, and having a diameter of from 4 to 5 inches to as many feet, this mass bearing the two original cotyledonary leaves, which, when they reach their full development of 6 feet in length or so, become dry and split up into shreds but do not fall off. Every year several short flower-stalks are developed at the base of these leaves, but no other leaves are produced. There seems to be but one species, *W. mirabilis*. It is placed among the Gnetaceæ.

Wen, an encysted tumor occurring on the scalp or other parts of the body. They are formed by the accumulation of sebum in a hair follicle, or in the recesses of the sebaceous gland of the hair sac, causing distension of the sac. An encysted tumor, in its commencement, is always exceedingly small, and perfectly indolent; and it is often many years before it attains any great size.

Wenceslaus (wen'ses-lȧs), or WENZEL, an Emperor of Germany and King of Bohemia; born in 1361; was the son of Charles IV, whom he succeeded in 1378. He favored the Hussites, but was unable to save the life of Huss. He died in 1409.

Wen-chow (wen'chou), a Chinese treaty port, in Chewkiang, at the head of a bay. Pop. 100,000.

Wends, the name of a section of the Slavonic race, now dwelling mostly in that part of Germany known as Lusatia, partly in Prussia, partly in the Kingdom of Saxony. In the sixth century the Wends were a powerful people, extending along the Baltic from the Elbe to the Vistula, and southwards to the frontiers of Bohemia. They comprised a variety of tribes. The favorite occupation of the Wends was, and still is, agriculture. There are several dialects of the Wend language still extant.

Wener (ven'er), the largest lake of Sweden, and after those of Ladoga and Onega the largest in Europe, situated in the southwest of the kingdom. It is 147 feet above sea-level, and of very irregular shape. Its greatest length, northeast to southwest, is about 100 miles; and its breadth may average about 30 miles; area, 2306 square miles. Its chief feeder is the Klar. By a canal it communicates with Lake Wetter, but its only proper outlet is at its southwestern extremity, where its superfluous waters are received by the river Gotha. In winter it is frozen for several months, and crossed by sledges. It abounds with fish.

Wenlock (wen'lok), a municipal borough of England, in Shropshire, 12 miles southeast of Shrewsbury. It comprises Much Wenlock, Broseley, Madeley, Coalbrookdale, etc. There are large iron and other industries. Pop. 15,244.

Wenlock Group, in geology, that subdivision of the Silurian system lying immediately below the Ludlow rocks, and so called from being typically developed at *Wenlock*. See *Geology*.

Wentletrap. See *Scalaria*.

Wentworth (went'wurth), SIR THOMAS, Earl of Strafford. See *Strafford*.

Werdau (ver'dou), a town of Saxony, on the river Pleisse, 25 miles w. s. w. of Chemnitz, with extensive manufactures of yarn and worsted, machinery, etc. Pop. (1905) 19,473.

Werden (ver'den), a manufacturing town of Rhenish Prussia, 15 miles northeast of Düsseldorf. Coal mining is carried on in the vicinity. Pop. (1905) 11,029.

Werewolf (wēr'wụlf), a man-wolf, a man transformed into a wolf according to a superstition prevalent in ancient and mediæval times. It was generally thought that such beings had the form of a man by day, and that of a wolf by night.

Werff (werf), ADRIAAN VAN DER, a Dutch painter, born near Rotterdam in 1659; died there in 1722. He was a pupil of Van der Neer, and among his celebrated paintings are the *Judgment of Solomon*, *Christ Carried to the Sepulcher*, *Ecce Homo*, *Abraham with Sarah and Hagar*, and *Magdalen in the Wilderness*. Van der Werff was particularly noted for his small historical pieces, which are most exquisitely finished, and still in high request.— His brother and pupil, PIETER VAN DER WERFF (born in 1665), painted portraits and domestic pieces, and was a very able artist. Died in 1718.

Wergild, WERGYLD. See *Anglo-Saxon*.

Werner (vėr'nėr), ABRAHAM GOTTLOB, a German mineralogist, born in 1750; died in 1817. In 1775 he was appointed inspector and teacher

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of mineralogy and mining in the Mining Academy at Freiberg, in which position he remained for the rest of his life. Werner was the first to separate geology from mineralogy, and to place the former on the basis of observation and experience. The great geological theory with which his name is connected is that which attributes the phenomena exhibited by the crust of the earth to the action of water, and is known as the Wernerian or Neptunian theory, in distinction to the Huttonian or Plutonic, in which fire plays the chief part.

Wernigerode (ver'ni-ge-rō-dė), a town of Prussia, in the province of Saxony, 43 miles southwest of Madgeburg, at the foot of the Harz Mountains. It has several interesting ancient Gothic buildings, a residence of the Counts Stolberg-Wernigerode, with a library of about 120,000 volumes, etc. Pop. (1905) 13,137.

Werra. See *Weser.*

Wesel (vā'zl), a river port and strongly fortified town in Rhenish Prussia, at the confluence of the Rhine and the Lippe, 30 miles N. N. W. of Düsseldorf. It contains the old Gothic church of St. Willibrord, recently restored, a fine old Gothic town house, and many quaint buildings. The manufactures comprise woolens, chemicals, leather, etc. Pop. (1905) 23,237.

Weser (vā'zėr), a river of Germany, formed by the junction of the Fulda and Werra at Münden, flows generally in a northwest direction, and, after a very circuitous course, traverses the city of Bremen, and then falls by a wide mouth, very much encumbered with sand-banks, into the German Ocean. Its length, including the Werra, is about 430 miles. The navigation for vessels of large size ceases about 10 miles below Bremen. See *Bremen.*

Wesley (wes'li), CHARLES, younger brother of John Wesley, was born at Epworth, England, in 1708, and was educated at Westminster School and Christ Church, Oxford. He accompanied his brother to Georgia as an ordained clergyman, but after his return to England he became, in 1738, a preacher in the Methodist connection, and materially assisted the success of the movement by his numerous hymns, large collections from which have been frequently published. He died in 1788. Two of his sons, Charles and Samuel, were celebrated for musical genius.

Wesley, JOHN, the founder of Wesleyan Methodism, was born at Epworth, Lincolnshire (his father being rector of the parish), June 17, 1703, and educated at the Charterhouse, and at Christ Church, Oxford. He took his degree of B.A. in 1724, was ordained deacon in 1725, became a fellow of Lincoln College, and lecturer and moderator in classics in 1726; and took priest's orders in 1728. He now gathered together a number of pupils and companions who met regularly for religious purposes, and by their strict and methodical habits acquired the name of Methodists. Among these companions were Hervey, Whitefield, and Law, the author of the *Serious Call to the Unconverted.* In 1735 Wesley accepted an invitation from General Oglethorpe to go out to America to preach to the colonists of Georgia. After a stay of two years he returned to England (Feb., 1738), and in the following May an important event took place in his inner religious life, namely, his conversion. In June he paid a visit to Herrnhut, the Moravian settlement, returning to England in September. Early in the following year (1739) he began open-air preaching, in which he was closely associated with Whitefield, from whom, however, he soon separated, but without a permanent personal breach. Having now the sole control of the religious body which adhered to him, he devoted his entire life without intermission to the work of its organization, in which he showed much practical skill and admirable method. His labors as an itinerant preacher were incessant. He would ride from 40 to 60 miles in a day. He read or wrote during his journeys, and frequently preached four or five times a day. He married in 1750 Mrs. Vizelle, a widow with four children, but the union was unfortunate, and they finally separated. He died March 2, 1791. He held strongly to the principle of episcopacy, and never formally separated from the Church of England. His collected works were published after his death in thirty-two volumes, octavo. He contributed to the collection of hymns, the greater part of which were written by his brother Charles. See *Methodists.*

Wesleyan Methodists. See *Methodists.*

Wessex (wes'seks), that is, WEST SAXONS, one of the most important of the Anglo-Saxon kingdoms in England during the sixth, seventh, and eighth centuries, and the early part of the ninth, and that in which the other kingdoms were ultimately merged in the reign of Egbert in 827. It included the counties of Devon, Dorset, Somerset

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Wilts, Hants, Berks and a part of Cornwall.

West, BENJAMIN, painter, born in Delaware Co., Pennsylvania, October 10, 1738. He showed great precocity in his aptitude for painting, and at the age of eighteen established himself as a portrait-painter at Philadelphia. In July, 1760, he visited Italy, and settling in Rome, painted *Cimon and Iphigenia*, and *Angelica and Medora*. He visited England in 1763, and was so well patronized that he determined to make it his future residence. He painted *Hector and Andromache*, *The Return of the Prodigal Son*, and a historical painting of *Agrippina*, the last for the Archbishop of York, who introduced him to George III, who became his steadfast patron, and gave him commissions to the extent of about £1000 a year for upwards of thirty years. He painted a series of historical works for Windsor, and for the oratory there a series on the progress of revealed religion. On the death of Reynolds, in 1792, he was elected president of the Royal Academy. He afterwards painted a number of religious and historical pictures of large size, among them being *Christ Healing the Sick* (in the National Gallery), the *Crucifixion*, *Ascension*, and *Death on the Pale Horse*. The *Death of General Wolfe at Quebec* and *The Battle of La Hogue* are accounted the best of his historical pieces. 'The 400 historical pictures which he painted show skill in composition and considerable inventive power, but they have no real vitality.' Tame in style and monotonous in color, they now possess little interest. Many of his works have been engraved. He died in London March 11, 1820, and was buried in St. Paul's Cathedral.

West African Colonies OF BRITAIN, the Gold Coast, Lagos, Gambia, and Sierra Leone (which see).

West Allis, a city of Milwaukee Co., Wisconsin, a few miles from Milwaukee. Its manufactures include engines, chains, belts, steam pumps, etc. Pop. 6645.

West Bay City (formerly Wenona), a former city of Bay Co., Michigan, on the Saginaw River, near its mouth, and opposite Bay City. It has shipbuilding and coal-mining industries, and manufactures lumber, beet-sugar, chicory, chemicals, etc. Pop. (1900) 13,119; it is now incorporated with Bay City.

West Berwick, a borough in Columbia Co., Pennsylvania, in an agricultural and manufacturing region. It is closely associated with Berwick, its banking point. Pop. 5512.

Westboro (west'bur-ō), a town of Worcester Co., Massachusetts, 33 miles from Boston, on the Boston and Albany Railroad. Its manufactures include iron and brass beds, trellises, tape, leather, straw and leather goods, underwear, etc. Pop. 5446.

Westbrook (west'bruk), a city of Cumberland Co., Maine, 5 miles N. W. of Portland. There are paper, cotton and silk mills, foundries and other industries. Pop. 8500.

West Bromwich, a municipal and parliamentary borough of England, in Staffordshire. It is in a rich iron and coal region and has extensive iron works and manufactures of metal goods. Pop. 68,345.

West Chester (west'ches-ter), a borough, capital of Chester Co., Pennsylvania, is situated 30½ miles W. of Philadelphia. It stands in a rich farming region, a rolling country, about 450 feet above tide-water, and has a notable courthouse, a botanical garden, and is the seat of a State normal school and other educational institutions. It has large grain and dairying industries, and manufactures of dairy supplies, wheels, tags, paper, etc. Pop. 11,767.

Westcott (west'kot), EDWARD NOYES, novelist, was born at Syracuse, New York, in 1847. He is known for one work, *David Harum: a Story of American Life*, of which the humor and skillful character drawing gave it a very wide circulation. He died March 31, 1898, before its publication.

Westerly (west'er-li), a village in Westerly township (town), Washington Co., Rhode Island, on the Pawcatuck River, 44 miles S. W. of Providence. Cottons and woolens are largely manufactured, also thread and printing presses, and a highly superior quality of granite is largely quarried. Pop. of town, 8696.

Western Australia, a British colony which includes all that portion of the Australian continent situated westward of 129° E. lon. This territory measures 1490 miles from N. to S., and 850 miles from E. to W. The total estimated area is 975,920 sq. miles, thus making it the largest of the Australian colonies. The really occupied portion, apart from scattered settlements round the coasts, is almost entirely in the southwest, and is about 600 miles in length, and 150 miles in average breadth. The remainder is almost wholly desert or sand-

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covered plain, with large areas destitute of vegetation. A region of mountains border the western coast line, with other more interior ranges. Western Australia was first settled in 1829 as the Swan River Settlement, and for many years the population was very small. In 1850 it was made a convict station, and remained such till the abolition of transportation in 1868. Since that time it has been making gradual progress. Perth is the capital, on Swan River. Besides this river there are, in the southwest, the Blackwood, Murray, Murchison, etc., further north, the Gascoyne, Ashburton, Fortescue, De Grey, Fitzroy, etc., none of them navigable at all seasons. The southwest has vast forests, which supply valuable timber for exportation, especially that known as jarrah (which see). Other trees are the lofty eucalyptus or blue gum, sandalwood, karri, etc. Copper and lead are found in abundance and are slightly worked. The other chief minerals are gold, coal, zinc, and iron; the gold deposits being widespread and the product of much value. The pearl fisheries are rising in value. The Kimberley and northern districts contain boundless pastures, and there are lands suitable for the growth of sugar, tobacco, wheat, etc. In the Kimberley district considerable quantities of gold are now obtained from quartz reefs. In other parts are soils and climates admirably adapted for the cultivation of silk, olives, the vine, etc. Fruits are abundantly general. The live stock includes sheep, cattle, horses, pigs, goats, and a few thousands of camels. Sheep are largely kept and the wool clip is large and valuable. The principal exports are wool, pearls and shells, timber, and sandalwood. The chief imports from Great Britain are apparel and haberdashery, ale, iron, cottons, telegraph wire, etc. In 1901 the colony became a State of the commonwealth of Australia, its population at that date being 184,124. Pop. (1914) 325,019.

Western Empire, a portion of the Roman empire, consisting of Italy, Illyricum, Spain, Gaul, Britain and Africa, which Valentinian I reserved for himself when in 364 he shared the imperial authority with his brother Valens, who reigned in Constantinople as Emperor of the East, and whose territories comprised the eastern half of the Roman Empire. This partition of the Roman Empire became final in 395, when Theodosius the Great divided the Roman world between his sons, Honorius, who became Emperor of Rome and the West, and Arcadius, who became Emperor of Constantinople and the East. The Western Empire terminated in 476.

Western Reserve, a tract of land in the N. E. of what is now the State of Ohio, once forming part of the claims of Connecticut in the Northwest Territory. When, by the treaty of 1783, Great Britain relinquished the territory S. of the Great Lakes and E. of the Mississippi, disputes arose among the States of Virginia, New York, Massachusetts, and Connecticut as to the right of occupancy in that locality. The difficulty was finally settled by the cession of the whole to the Federal government, but Connecticut reserved a tract of nearly 4,000,000 acres on Lake Erie. The State finally disposed of this in small lots to colonists, and so accumulated a very large school fund.

Westfield (west'fēld), a town (township), of Hampden Co., Massachusetts, on Westfield River, 9 miles W. of Springfield. It contains a State Normal School, Westfield Athenæum, and other institutions. The manufactures are extensive and include whips, cigars, paper, steam heaters, machinery, thread, etc. The town was settled in 1658. Pop. 16,044.

Westfield, a town of Union Co., New Jersey, 7 miles W. by S. of Elizabeth. It is chiefly a residence place for New York business men. Pop. 6420.

West Haven, a borough of New Haven Co., Connecticut, separated from New Haven by the West River. It has manufactures of buckles, pianos, safes, etc. Within its limits is Savin Rock, on Long Island Sound, a popular resort. Pop. 8543 (included in pop. of Orange).

West Hoboken, a town of Hudson Co., New Jersey, near the Hudson River, contiguous with Hoboken and Jersey City. Its manufactured products include embroideries, silks, braids, pearl buttons, artificial flowers, etc. The town was set off from Bergen in 1861. Pop. 35,403.

Westhoughton (-hō'ten), a township in Lancashire, 5 miles W. S. W. of Bolton, with manufactures of silk and cotton, and coal mining. Pop. 15,046.

West India Apricot. See *Mammee-tree.*

West Indies (-in'dēz), also called the ANTILLES, the extensive archipelago which lies between North and South America, stretching from Florida to the shores of Venezuela. It is divided into the Bahamas, the group

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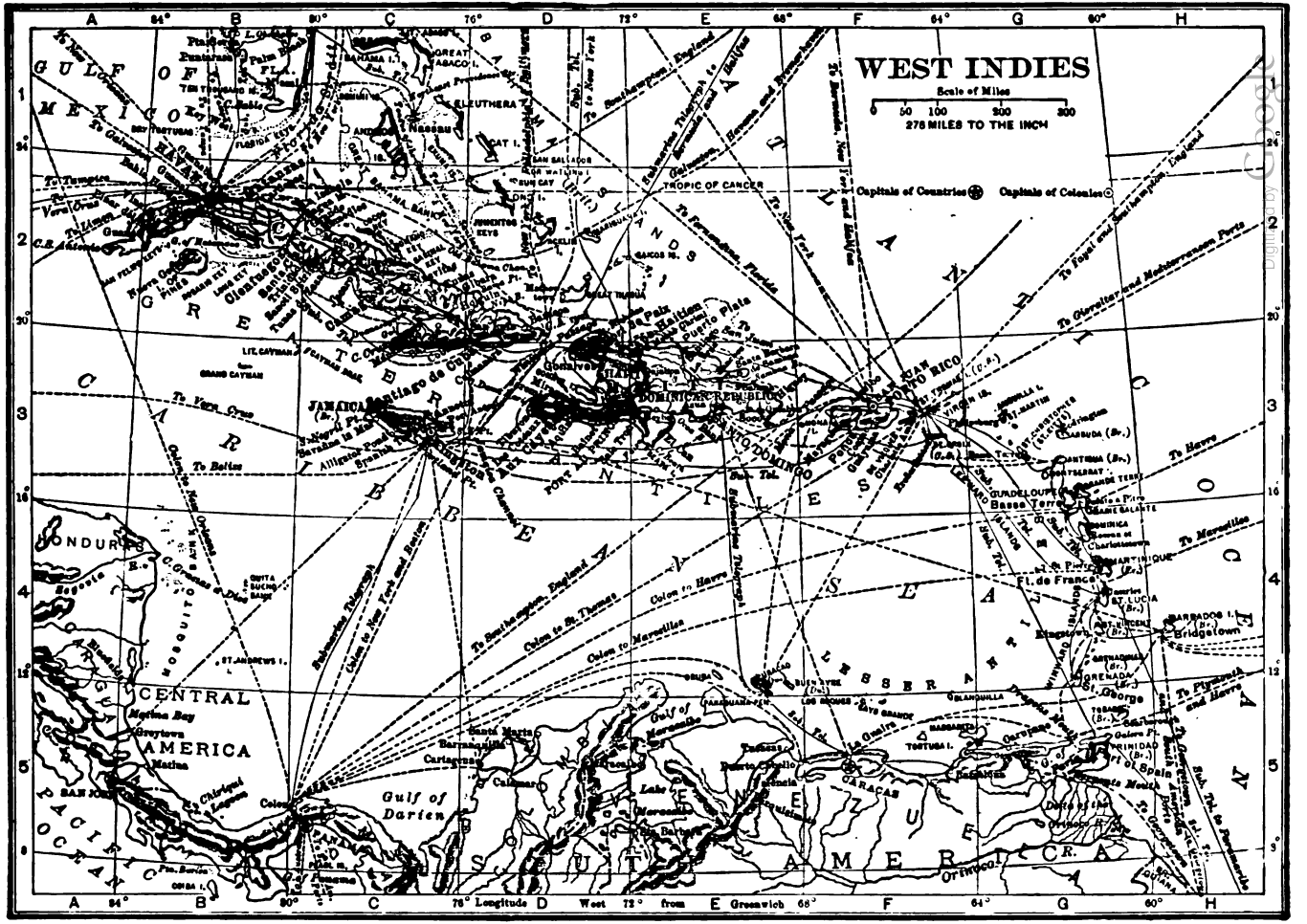
WEST INDIES
Scale of Miles
0 50 100 200 300
275 MILES TO THE INCH
Capitals of Countries
Capitals of Colonies
GULF OF MEXICO
CARIBBEAN SEA
ATLANTIC OCEAN
CENTRAL AMERICA
PACIFIC OCEAN
SOUTH AMERICA
LESSER ANTILLES
GREAT ANTILLES
HAVANA
JAMAICA
Santiago de Cuba
Gonaives
HAITI
DOMINICAN REPUBLIC
SANTO DOMINGO
PORTO RICO
SAN JUAN
Basse Terre
Ft. de France
Bridgetown
St. George
Port of Spain
Gulf of Darien
Gulf of Maracaibo
Lake Maracaibo
Orinoco R.
Colon
Colon to Havre
Colon to Marseilles
Colon to St. Thomas
Colon to New York and Balton
Submarine Telegraph
To Southampton, England
To Havre
To Marseilles
To Gibraltar and Mediterranean Ports
To Foyal and Southampton, England
To Plymouth and Havre
To Vera Cruz
To Belize
To New York
To Bermuda, New York and Halifax
TROPIC OF CANCER
Longitude West from Greenwich

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stretching from near the coast of Florida in a southeasterly direction; the Greater Antilles, comprising the four largest islands of the group, Cuba, Hayti, Porto Rico and Jamaica; and the Lesser Antilles, stretching like a great bow, with its convexity towards the east, from Porto Rico to Trinidad, near the coast of Venezuela. Almost the whole archipelago lies within the torrid zone. The total area does not exceed 95,000 square miles, of which the Greater Antilles occupy nearly 83,000 square miles. The climate is tropical, but modified by the surrounding oceans and the elevated surface of many of the islands, and the islands abound in tropical productions, as sugar, cotton, coffee, tobacco, maize, etc.; oranges, lemons, limes, pomegranates, citrons, pineapples, etc.; manioc, yams, potatoes, etc. Except Hayti and Cuba (which are independent), Porto Rico, Santa Cruz, St. Thomas, and St. Johns (which now belong to the United States, the latter three purchased recently from Denmark), and a few islands off the coast of S. America, the W. I. Islands are in the possession of European powers. The chief *British* possessions are: Jamaica, Barbados, St. Lucia, St. Vincent, Trinidad, Tobago, Antigua, St. Kitt's, Dominica, Virgin Islands and the Bahamas.—*Dutch:* St. Eustatius, Saba, St. Martin (partly French), Bonaire or Buen Ayre, Curaçao, and Oruba or Aruba.—*French:* Martinique, Deseada, Guadeloupe, Marie Galante, St. Martin (partly Dutch), St. Bartholomew, and Les Saintes. See the various islands and groups.

Westinghouse (west'ing-hous), GEORGE, inventor, capitalist and manufacturer, was born at Central Bridge, New York, in 1846. He entered the machine shop of his father and at the age of 15 designed a rotary engine. He served in the Union army in 1863-64. He is best known by the famous air-brake that bears his name, so generally used in railroad traffic. He originated other devices, including electrical machinery, railroad signals, etc., and was an extensive manufacturer of electrical goods, his enormous manufacturing establishment, that of the Westinghouse Mfg. Co., being at Pittsburgh, Pa. He died, March 12, 1914.

Westlake (west'lāk), WILLIAM, born in Cornwall, England, in 1831; removed to Milwaukee, Wis., early in life; later learned the tinsmith's trade; was employed by Capt. John Ericsson to make models for his first hot-air engine. His inventions embrace the Westlake car heater, the globe lantern, the oil cook stove, the stove board, etc. He died December 28, 1900.

Westmacott (west'ma-kot), SIR RICHARD, sculptor, born in London in 1775. In 1793 he went to Rome to study under Canova, and made such progress that he gained the pope's annual gold medal for sculpture. He also obtained a first prize for sculpture at Florence. In 1798 he returned to England, and rose rapidly in his profession. Many of the monuments in St. Paul's are from his chisel. He designed also the *Achilles* in Hyde Park, the statue of Lord Erskine in Lincoln's Inn Old Hall, that of Nelson in the Liverpool Exchange, besides statues of Addison, Pitt, etc. He was elected an associate of the Royal Academy in 1805, a full member in 1816, and in 1827 succeeded Flaxman as lecturer on sculpture. In 1837 the dignity of knighthood was conferred on him. He died in 1856.

Westmeath (west'mēth), a county in Ireland, in the province of Leinster, with an area of 708 sq. miles. The surface is hilly in the north, but elsewhere undulates gently. The drainage is shared between the Shannon and the Boyne. The former, with its expansion Lough Ree, forms the western boundary of the county; other rivers are the Brosna and the Inny; and there are a number of lakes. The principal grain crop is oats, but the larger part of the available surface is devoted to grazing. Important means of communication are furnished by the Shannon, the Royal Canal, and a branch of the Grand Canal. The county town is Mullingar. Pop. of county, 61,629.

Westminster (west'min-ster), a city of Middlesex, England, seat of government and the residence of royalty, is now so united with London that in appearance they form one city, and in ordinary speech are mentioned as one, though they have their separate jurisdictions. Temple Bar (now removed) separated the two cities. Within the city and liberties are Westminster Hall, Abbey, and School, Buckingham Palace, the Houses of Parliament, St. James' Palace, the Whitehall Banqueting House, etc. Pop. 160,277. (See *London.*)

Westminster Abbey, the coronation church of the sovereigns of England, and one of the chief ornaments of London, is a magnificent Gothic pile, situated near the Thames, and adjoining the Houses of Parliament. In 1065 a church was built here in the Norman style by Edward the Confessor. Part of this structure still

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remains in the pyx-house and the south side of the cloisters; but the main building, as it now stands, was begun in 1220 by Henry III (who built the choir and transepts), and was practically completed by Edward I. Various additions, however, were made (including the nave and aisles, the west front, and the Jerusalem Chamber) down to the time of Henry VII, who built the chapel which bears his name, while the upper parts of the two western towers were designed by Sir Christopher Wren. The extreme length of the church, including Henry VII's chapel, is 531 feet; breadth of transepts, 203 feet; height of the roof, 102 feet; height of towers, 225 feet. The coronation ceremony takes place in the choir, where the coronation stone brought by Edward I from Scotland is situated beside the coronation-chairs of the English sovereigns. Westminster Abbey is distinguished as the burial-place of numerous English kings from Edward the Confessor to George II; the north transept is occupied chiefly by monuments to warriors and statesmen; while in the south transept is situated the 'Poets' Corner,' the burial and memorial place of most of England's great writers from Chaucer to Robert Browning. See *London.*

Westminster Assembly of Divines, a celebrated assembly held at Westminster for the settlement of a general creed and form of worship throughout Great Britain. By an ordinance passed June 12, 1643, 121 clergymen, with ten lords and twenty commoners as lay assessors, were nominated as constituents of the assembly. The assembly began its sittings in July, 1643, in Westminster Abbey, but in the meantime a royal proclamation had been issued forbidding the assembly to meet, which had the effect of inducing the greater part of the Episcopal members to absent themselves. The majority of those who remained were Presbyterians, but there was a strong minority of Independents. A deputation was now sent along with commissioners from the English parliament to the General Assembly of the Scottish Church and the Scottish Convention of Estates, soliciting their coöperation in the proceedings of the Westminster Assembly, and accordingly in September four Scottish clergymen, with two laymen, were admitted to seats and votes by an act of the English legislature. The assembly continued to hold its sittings till February, 1649. Among the results of its deliberations were the *Directory of Public Worship,* the *Confession of Faith,* and the *Larger and Shorter Catechisms,* which remain practically the standards of the Presbyterians to the present day. At the Restoration the whole proceedings of the Westminster Assembly were annulled as invalid.

Westminster Hall, the hall of the old palace of Westminster, was erected by Richard II (1397-99) on the foundations of a structure built by William Rufus. It has a fine porch, and its hammer-beam roof of carved timber is considered the most notable of its kind; length of the building, 290 feet, breadth 68 feet, and height 110 feet. This building is closely associated with many stirring events in English history; but it is chiefly remarkable as the place where were held such great State trials as those of the Chancellor More, Lady Jane Grey, the Earl of Strafford, King Charles I, and Warren Hastings, and as the center of the highest English courts of law till these were removed to the new buildings recently erected for their accommodation. The hall now serves as a fine vestibule to the Houses of Parliament.

Westminster School, or the Royal School of St. Peter's, Westminster, one of the great public schools of England, was founded in 1560, and was reorganized in 1868. There are forty foundationers, the number of vacancies yearly being ten.

Westmoreland (west'mōr-land), a county in England, bounded by Cumberland, Lancashire, Morecambe Bay, Yorkshire, and Durham; area, 783 square miles. The surface, with the exception of a small portion in the south sloping to Morecambe Bay, is very mountainous. Much of the celebrated lake scenery of England is within the limits or on the borders of this county, the chief lakes being Ulleswater, Grasmere, Rydal Water, and Windermere. The principal rivers are the Eden, Lune, and Kent. The minerals include graphite, roofing slate, marble, and small quantities of coal, lead, and copper. Appleby is the chief town. Pop. 63,575.

Westmount, a town of Quebec province, Canada. Pop. 14,579.

West New York, a town of Hudson Co., New Jersey, adjacent to West Hoboken. It has silk mills. Pop. 13,560.

Weston-super-Mare (mā'rē; that is, Weston-on-Sea), a seaport and watering-place

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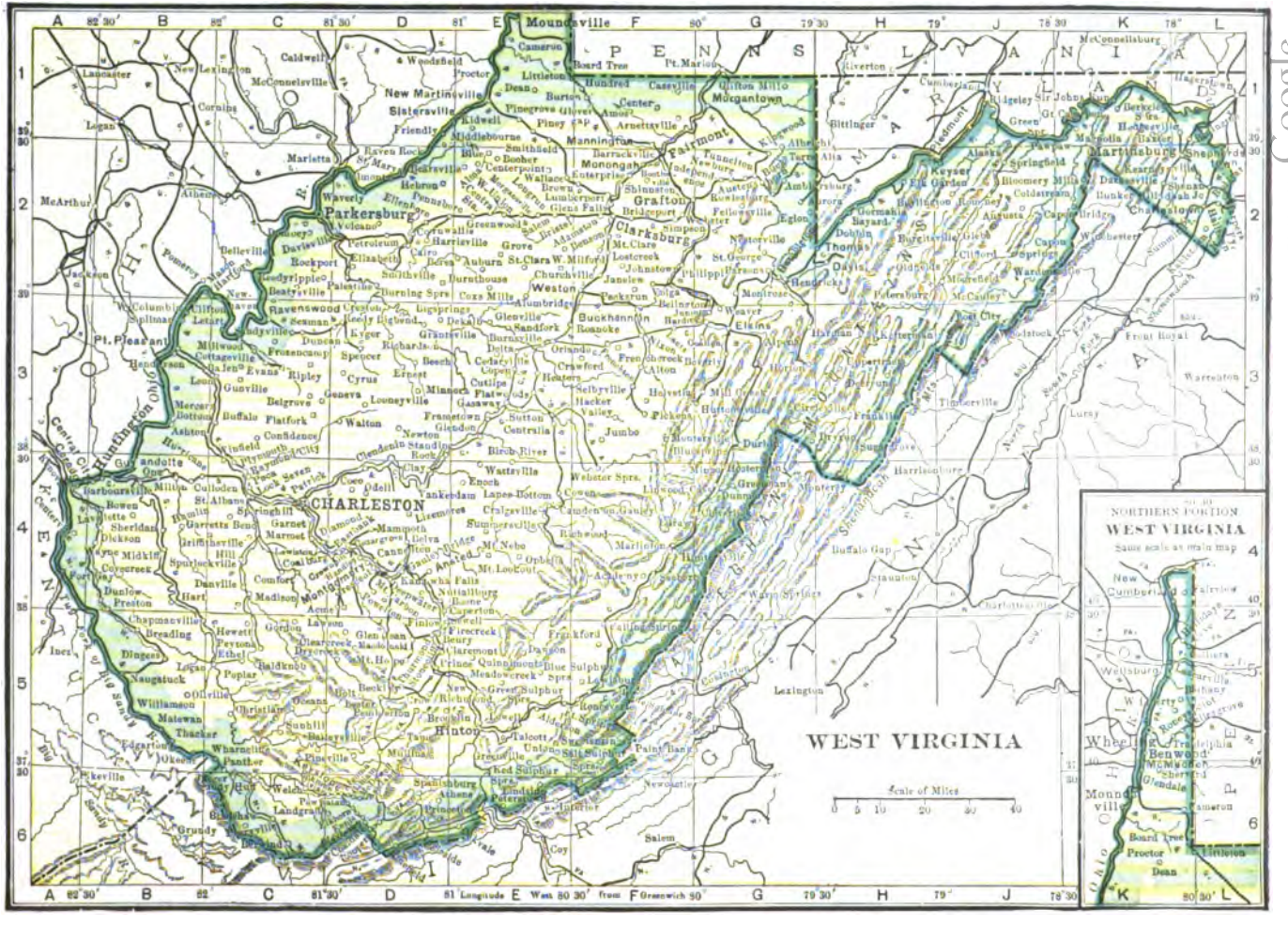

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in England in the county of Somerset, on the Bristol Channel, 19 miles southwest of Bristol. It is recommended as a place of resort both in winter and summer. A fine esplanade, pier, etc., are here. Pop. 23,235.

West Orange, a town of Essex Co., New Jersey, adjoining the city of Orange. It contains Llewellyn Park, a beautiful residential tract on the S. E. slope of Orange Mountain; also a large country club. Hats, etc., are made here. Pop. 10,980.

Westphalia (west'fā-li-a), the name given at different periods to (1) one of the circles of the old German Empire; (2) one of Napoleon's kingdoms (1807-13), conferred upon his brother Jerome; and (3) now to a province of Prussia. The latter is bounded by Rhenish Prussia, Holland, Hanover, Brunswick, Hesse and Nassau. Its area is 7771 square miles. The surface in the south and northeast is generally mountainous; the northwest spreads out into extensive and often marshy plains, and belongs to the basin of the Ems; the northeast and a small part of the east to the basin of the Weser; the remainder, constituting the far larger portion of the whole, belongs to the basin of the Rhine, whose chief tributaries are the Ruhr and Lippe. Besides iron and coal in abundance the minerals include copper, lead, zinc and salt; and the manufactures are varied and important. The province is divided into the three governments of Münster, Minden and Arnsberg. Münster is the capital. Pop. (1905) 3,618,090.

Westphalia, PEACE OF, the name given to the peace concluded in 1648 at Münster and Osnabrück, by which an end was put to the Thirty Years' war (which see). By this peace the sovereignty of the members of the empire was acknowledged. The concessions that had been made to the Protestants since the religious peace in 1555 were confirmed. The elector-palatine had the palatinate of the Rhine and the electorate restored to him; Alsace was ceded to France; Sweden received Western Pomerania, Bremen, Verden, Wismar and a sum equal to £750,000; Brandenburg, Mecklenburg, Hanover and Brunswick were compensated by the secularization of numerous ecclesiastical foundations. The independence of the United Provinces was recognized by Spain.

West Pittston, a borough of Luzerne Co., Pennsylvania, on the North Branch of the Susquehanna River, opposite Pittston, and on the Lackawanna and Lehigh Valley Railroads. Pop. 6848.

West Point, a village of New York, on the Hudson river, about 50 miles above New York City. It is notable as the seat of the United States Military Academy, and is a favorite summer resort. A fortress was built here during the Revolutionary war, and the treason of Benedict Arnold consisted in his endeavor to deliver this to the British. The site of the academy commands one of the finest river views in the world.

West Troy, the official post-office designation of the town of Watervliet (which see).

Westport (west'pōrt), a seaport in Ireland, County Mayo, at the mouth of a small river in Clew Bay, 10 miles S. S. W. of Castlebar. Pop. 3892.

West Springfield, a town (township) in Hampden Co., Massachusetts, with a village of the same name, on the Connecticut River, opposite Springfield. It has some manufactures. Pop. of town, 9224.

West Tampa, a city of Hillsboro Co., Florida, in West Tampa precinct. Pop. 8258.

West Virginia, a State of the American Union, bounded N. and E. by Pennsylvania and Maryland, E. and S. by Virginia, and W. by Ohio and Kentucky; area 24.170 sq miles. The surface is very largely mountainous and hilly, being traversed in the east and center by parallel ranges of the Allegheny Mountains. About two-thirds of the area is covered with forests. The soil of the ridges is fertile, and the summits of many of the mountains are level, forming natural meadows or glades. Blue grass is indigenous and grazing excellent, especially in the valley of the Great Kanawha. The forests are chiefly made up of hardwood trees of valuable kinds, making the lumber interest very important; coal is a highly valuable product, nearly the whole State lying within the Allegheny coal system. The coal is bituminous and is estimated to underlie 16,000 square miles. Petroleum is also abundant and is extensively produced, and natural gas is found in some sections. Other minerals include salt, largely produced; iron-ore, glass-sand, kaolin, limestone and grinding stone. The minerals and mineral springs are practically inexhaustible. The live-stock interests of the State are large, especially sheep, West Virginia being famous for its wool. The agricultural staples include corn, wheat, oats and

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tobacco, and orchard fruits are extensively cultivated. Manufactures are as yet little developed, except in the towns on the Ohio river, but the State has enormous water-power, all its streams having a rapid descent. This will undoubtedly be utilized. The leading industries are those of steel and iron, glass, flour, salt, lumber and wood products, coke, pottery, firebrick, leather, cigars and tobacco. Wheeling is the largest and most important city; and the manufacturing center, nearly all the industries named flourishing here. Pop. 1,221,119.

Westward-Ho, a sea-bathing place of England, in the county of Devon, on Barnstaple Bay, about 3 miles N. W. of Bideford. Westward-Ho College is a military school, and there is an excellent golfing links.

Wetter (vet'ter), a lake in Sweden, about 24 miles southeast of Lake Wener; greatest length, 80 miles; medium breadth, about 15 miles. Its height above the level of the Baltic is nearly 300 feet, but its depth is in some parts above 400 feet. The Wetter forms part of the canal connection between the Cattegat and the Baltic. The chief town on its shores is Jönköping.

Wetterhorn (vet'ter-hörn), a mountain of Switzerland, in the Bernese Oberland, with three peaks respectively 12,149, 12,166 and 12,107 feet high.

Wetzlar (vetz'lär), a town in Rhenish Prussia, at the junction of the Lahn and Dill. It was anciently a free imperial town, and was the seat of the imperial German court of justice from 1698 to 1806. Pop. (1905) 12.276.

Wexford (weks'furd), a maritime county in Ireland, on the Irish Sea and St. George's Channel; area 901 sq. miles. The chief inlet on the east coast is Wexford Harbor, which, though spacious, is of intricate navigation and obstructed by a bar. The surface of the interior is hilly, rising into a ridge on the northwest, declining into a level peninsula to the southeast. The chief rivers are the Slaney and Barrow. The prevailing soil is stiff clay, generally well cultivated, and producing oats, wheat, barley, and potatoes. The fisheries are extensive. Pop. 104,104. — WEXFORD, the county town, is a seaport on the river Slaney, where it enters Wexford Harbor. The herring and salmon fisheries employ many persons; malt is manufactured, and distilling, brewing, and shipbuilding are carried on. The chief trade is in exporting grain, cattle, poultry, butter, etc. Pop. 11,168.

Wexiö (vek'si-eu), a cathedral city of Southern Sweden, with an old cathedral. Pop. 7365.

Weyler, VALERIANO Y NICOLAU, a Spanish general, born at Barcelona in 1840. He was a military attaché of Spain at Washington during the American Civil war and served in the army under Sheridan. He took part in the Carlist war, has a high reputation as a soldier, was made governor of the Canary Islands in 1879 and captain-general of the Philippine Islands in 1889. He afterwards held high offices in Spain and in 1896 was sent to Cuba to suppress the insurrection. His ruthless cruelty to the natives excited such indignation in the United States that he was recalled in the autumn of 1897.

Weyman (wā'man), STANLEY JOHN, an English novelist, born at Ludlow in 1855. His novel of romance and adventure, *A Gentleman of France* (1893), became highly popular, and was followed by a number of others in the same vein.

Weymouth and Melcombe-Regis, a seaport of England, in Dorsetshire, on a semicircular bay, 7 miles south-southwest of Dorchester, Weymouth being on one side, Melcombe-Regis on the other of the small river Wey, over which is a bridge. There is a considerable coasting trade, the chief export being Portland stone. Malcombe-Regis attracts numerous visitors. There is a fine esplanade, about 1 mile in length. Pop. 22,325.

Weymouth (wā'muth), a seaport in Norfolk Co., Massachusetts, on Boston Harbor, 11 miles S.S.E. of Boston. It has manufactures of boots and shoes, isinglass, fireworks, etc., and a considerable trade. Pop. 12,895.

Whale (wāl), the common name given to the larger mammals of the order Cetacea (which see). They are characterized by having fin-like anterior limbs, the posterior limbs being absent, but having their place supplied by a large horizontal caudal fin or tail. Their abode is in the sea or the great rivers, and they resemble the fishes so closely in external appearance that not only non-scientists, but even some of the earlier zoölogists regarded them as belonging to that class. The whales are usually divided into two families, the Balænidæ and the Physeteridæ or Catodontidæ. The Balænidæ, or whalebone whales, are distinguished by the absence of teeth, by the presence of baleen or whalebone in the mouth. The typical representative of this family is the com-

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THE WETTERHORN AERIAL RAILWAY

This remarkable railway operates on the famous Wetterhorn Mountain in Switzerland. The cars, each holding twenty passengers, are carried on wire cables and balance each other by means of a cable attached to each, which passes around a drum at the top.

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most of the Greenland whale (*Balæna mysticētus*), so valuable on account of the oil and whalebone which it furnishes. (See *Whalebone.*) It is principally found in the Arctic seas, but it is also found in considerable numbers in many other parts of the world. Its length is usually about 60 feet, and its greatest circumference from 30 to 40 feet. Allied to the Greenland whale is the rorqual. It measures as much as 85 feet in length, and from 30 to 35 feet in circumference. (See *Rorqual.*) Of the Physeteridæ or Catodontidæ, the best known species is the sperm-whale or cachalot (*Physēter* or *Catodon macrocephălus*), which averages from 50 to 70 feet in length. (See *Sperm-whale.*) Some species of the Delphinidæ or dolphin family are also known as whales. (See *Beluga, Caaing-whale.*) Whale fishing for the sake of the oil and whalebone has been an important industry since the twelfth century. It was for long prosecuted with great energy by the Dutch, English, French, and Americans, but of recent times it has greatly decreased, chiefly on account of the scarcity of whales. The British whaling fleet now numbers barely a dozen vessels, mostly belonging to Dundee and Peterhead. The American whale fishery is chiefly prosecuted by New Bedford vessels, but is fast dwindling away. The instruments used in the capture of the whale are the harpoon and the lance. The harpoon is an iron weapon about 3 feet in length, terminating in an arrow-shaped head. This is attached to a line, and is thrown at the whale by hand, so as to transfix it, or is discharged from a small swivel cannon placed in a boat. The lance is a spear of iron about 6 feet in length, terminating in a thin sharp steel head. These, with the necessary lines, boats, etc., are all the apparatus required for capturing the whale. In modern whale fishing guns, with explosive bullets, are brought into use, and the danger of the fishery is greatly reduced. When captured the animal is cut up, the blubber boiled and the oil extracted, and the whalebone dried. In recent years there has been an increase in the amount of whale products in America, with a corresponding increase in prosperity.

Greenland Whale (*Balæna mysticētus*).

Whaleback, the name of a form of steam vessel invented by Capt. Alexander McDougall, of West Superior, Wisconsin, in 1874, for use on the Great Lakes. In 1888 the first whaleback barge was built of 437 tons registry and 1400 tons capacity. The name whaleback was suggested by the resemblance of the visible portions of the vessel, when afloat, to the back of a whale. A whaleback crossed the Atlantic in 1891. Vessels of this kind are now in common use.

Whalebone (wāl'bōn), or BALEEN, a well-known elastic horny substance which hangs down in thin parallel plates from the sides of the upper jaw of the family of whales called Balænidæ. These plates or laminæ vary in size from a few inches to 12 feet in length; the breadth of the largest at the thick end, where they are attached to the jaw, is about a foot, and the average thickness is from four to five tenths of an inch. From its flexibility, strength, elasticity, and lightness, whalebone is employed for many purposes, as for ribs to umbrellas and parasols, for stiffening corsets, etc. In commerce it is often called *whale-fin.*

Whale-louse (*Cyămus ceti*, order Læmodipoda), a genus of small crustaceans, so named from living a parasitic life on whales and other cetaceans.

Whampoa (hwăm-pō'a), a port of China, on an island of the same name, 12 miles E. of Canton, with commodious docks, etc., for the cleansing and repair of vessels.

Wharton (hwar'tun), ANNA HOLLINGSWORTH, author, born in Cumberland Co., Pennsylvania. She became a resident of Philadelphia and wrote *Through Colonial Doorways, A Last Century Maid, Heirlooms in Miniature,* and other works dealing with Colonial life.

Wharton, EDITH, American author, born in New York City in 1862. Her fiction includes: *The Valley of Decision* (1902), *The Descent of Man and Other Stories* (1904), *The House of Mirth* (1905). *The Fruit of the Tree* (1907) and *Ethan Frome* (1912).

Wharton, FRANCIS, jurist was born at Philadelphia in 1820;

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died in 1889. He became professor of logic and rhetoric of Kenyon College, Ohio, in 1856; was afterwards ordained as a rector in the Episcopal Church, and became professor in the Episcopal divinity school at Cambridge, Mass.; also professor of international law in the Boston Law School, and in 1885 solicitor for the State Department at Washington. He wrote *A Treatise on the Criminal Law of the United States, A Treatise on Medical Jurisprudence, The Conflict of Laws*, etc.

Wharton, JOSEPH, manufacturer, was born at Philadelphia in 1826; died in 1909. He engaged in the white-lead manufacture, was manager of the Lehigh Zinc Co., 1853-63, aided in founding the Bethlehem Iron Co., and established extensive nickel works at Camden, New Jersey. He founded the Wharton School of Finance and Economics, University of Pennsylvania, and endowed a chair of history and economics at Swarthmore College.

Wharton, THOMAS WHARTON, MARQUIS OF, born 1640; died 1715; is the reputed author of the celebrated political ballad *Lillibullero*, and was severely castigated by Swift.— His son, PHILIP WHARTON (1699-1731), was created a duke in 1720. Like his father, he lived a very profligate life, and is now chiefly remembered as the subject of Pope's satire, as his father was of Swift's.

Whately (hwāt'li), RICHARD, Archbishop of Dublin, was born in London in 1787; died in 1863. He received his education at a private school at Bristol, and at Oriel College, Oxford. He graduated B.A. in 1808, and in 1810 won the English essay prize. In 1819 he made his first appearance as an author by publishing his famous *Historic Doubts Relative to Napoleon Bonaparte*. In 1822 Whately was appointed Bampton lecturer at Oxford, and delivered eight lectures *On the Use and Abuse of Party Feeling in Matters of Religion*. He held the living of Halesworth in Suffolk in 1822-25, and was then appointed principal of St. Alban's Hall, Oxford. In the latter year he published *Essays on Some of the Peculiarities of the Christian Religion*. A second series of essays *On Some Difficulties in the Writings of St. Paul and Other Parts of the New Testament*, came out in 1828; and a third series, *The Errors of Romanism Traced to Their Origin in Human Nature*, in 1830. In 1827 was published *The Elements of Logic*, and the scarcely less popular *Elements of Rhetoric* in 1828. Both of these works were written originally for the *Encyclopædia Metropolitana*. He occupied the chair of political economy at Oxford in 1830-31, and afterwards published *Introductory Lectures on Political Economy*. In 1831 he was appointed archbishop of Dublin, a position in which he did much for national education and other worthy objects in Ireland, including the foundation and endowment of a chair of political economy in Trinity College. Besides the works mentioned he wrote or edited many others.

Wheat (hwēt; *Triticum sativum*), the most important species of grain cultivated in Europe, and a very important crop in America, India, Australia, etc. It grows readily in almost every climate; but its natural home seems to be a temperate climate, and the soils best adapted for its culture are rich clays and heavy loams. Of cultivated wheats there are many varieties, the differences, however, being mostly due to soil, climate, and mode of cultivation. Three primary varieties may be mentioned: (*a*) *T. hybernum* (*muticum*), winter or unbearded wheat; (*b*) *T. æstivum* (*aristatum*), summer or bearded wheat; (*c*) *T. spelta* (*adhærens*), spelt or German wheat, which is of much less value than the others, but grows on poorer soils and more elevated localities. White wheat and red wheat are names applied according to the color of the grain, the red sorts being generally hardier than the white, but of inferior quality, and the yield is less. Winter wheat is sown in the autumn, with the view of being harvested the following year; summer wheat is sown in the spring of the year in which it is reaped. The native country of the cultivated wheat has usually been considered to be the central parts of Asia, and it has been reported as growing wild in Kurdistan, Mesopotamia and elsewhere, but this lacks proof. It has been cultivated from a very early period, probably as early as 3000 B.C. in China. It was one of the principal crops in ancient Egypt and Palestine, and has been found in the lake dwellings of prehistoric Europe. It is now cultivated in all the temperate parts of the continents, is grown to a considerable extent in northern India, and is very extensively cultivated in the United States, Canada and wide regions of South America. Wheat of very fine quality is produced in Australia. It does not thrive in the torrid zone, except in elevated situations, though it does well in subtropical regions. A hardy plant, it can endure very severe

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winters if covered with snow. For its successful cultivation it must have a mean temperature of not less than 55° F. for three or four months of the year. As it is an annual plant, its capacity for enduring cold is of importance, since this permits it to be sown in the autumn, so as to have a good start in the following spring. Its cultivation does not extend as far north as that of oats, rye or barley, its northern limit in Europe being about 60° N. latitude. The quality of the grain varies in different soils and climates, and certain varieties are distinguished by difference of quality and of external appearance. The varieties of wheat are, from its long cultivation, very numerous, many of these varieties being in high esteem in certain districts, though little known beyond them. The relative proportions of straw and grain differ greatly in different varieties, the proportion of grain to that of straw when dried for stacking varying from 20 to 47 per cent. The value of wheat depends mainly upon the quantity of fine flour which it yields, the best wheat yielding 76 to 80 per cent., at times as much as 86 per cent., while inferior wheat may be under or little over 60 per cent. In general the smoother and thinner the grain is in skin the more fine flour it yields. The greater part of the husk is separated in milling and is known as bran.

Wheat being the most esteemed of the cereals, especially for bread-making, the increase in its growth has kept pace with the development of the art of agriculture and the increase in wealth in many countries. Yet, only within recent times has it become a common article of food among the laboring classes in any country and it is still little eaten by these classes in many countries. On the other hand its use is growing in some of the rice-eating countries, as in China. In England, down to the beginning of the eighteenth century, only the wealthier classes used wheaten bread as a common article of food, house servants being provided with rye, oats or barley, and in northern England and Scotland the use of wheaten bread was very rare for half a century later. At the present day the use of wheat is spreading rapidly throughout the world as the most desirable and palatable bread-making cereal. For many years past the United States has been the greatest of wheat producers, growing annually enough to supply Europe largely with wheat flour from its surplus, while retaining an abundance for home use. The rapid increase in its population, however, has greatly diminished the quantity it can spare to send abroad and the extra supply needed in Europe is now largely obtained from other countries. Chief among these may be named Argentina and Canada, both of these countries possessing large areas fitted for wheat cultivation. Though they have come somewhat recently into the market for wheat supply, their annual harvest is rapidly increasing and their surplus for exportation growing. Wheat is not native to America, its first introduction being by the Spaniards about 1630. It was planted in New England and Virginia shortly after their settlement, the spread of its cultivation keeping pace with that of settlement and its production becoming phenomenal in the middle west within a comparatively recent period. Of late years a variety of wheat adapted to dry climates has been introduced, with the result that a large area of semiarid land, unadapted to the former varieties, is becoming a wheat-raising territory of some importance. This is not well fitted for bread-making, and is known as macaroni wheat, from its chief use. At the present time the United States and European Russia are about equal in product, each having an annual yield of about 700,000,000 bushels. France and British India come next with about half this quantity and Austria-Hungary with about 250,000,000. Other countries with over 100,000,000 bushels each are Canada, Argentina, Germany, Italy, Roumania and Spain. The principal diseases to which the wheat plant is subject, some of them the source of great loss to farmers, are due to the presence of parasitic fungi, the chief of these diseases being known as rust, smut, bunt, and mildew. The plant is attacked also by a number of insect pests, such as threadworms, wireworms and others of what are known as corn insects. The Hessian fly has long been a destructive enemy of wheat in American fields, first known as scourge in the years 1786 and 1789, and claimed to have been introduced from Germany by the Hessian mercenaries in the British army. In some years it has caused enormous loss. The eggs are laid on the leaves, and the larvæ bore into the stem, suck the juices and kill the plant.

Wheat-ear (*Saxicŏla œnanthe*), a bird of the order Insessores belonging to the dentirostral section of the order, and to the family of the Sylviadæ or warblers. Its average length is 6½ inches, and its color gray above, breast brown, and under parts white. It is a native of northern Europe and Asia, and is found in Alaska and Greenland.

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Wheat-eel, a disease in wheat called also *ear-cockle* and *purples*. See *Ear-cockle*.

Wheat-fly, a name common to insects of the genus *Cecidomyia*, applied especially in England to *C. tritici*, sometimes also called the *wheat-midge*. It is a two-winged gnat about the tenth of an inch long, and appears about the end of June. The females lay their eggs in clusters among the chaffy flowers of the wheat, where they produce little footless maggots, whose ravages destroy the flowers of the plant, and render it shriveled and worthless. The American wheat-fly (*C. destructor*) is described and figured under *Hessian-fly*.

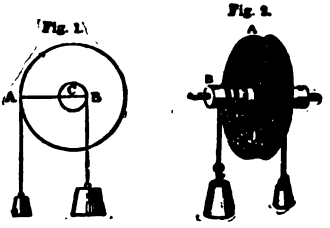
Wheaton (hwē'tun), Henry, jurist and diplomatist, born at Providence, Rhode Island, in Nov., 1785; died in March, 1848. He studied law, edited the *National Advocate* in New York, and held official positions, becoming minister to Germany in 1837. He gained a wide reputation for his able works on legal subjects, especially his *Elements of International Law*, a standard authority, and *History of the Law of Nations in Europe and America*, a work of the greatest merit. Among his other works is a *History of the Northmen*.

Wheatstone (hwēt'stun), Sir Charles, scientific investigator and discoverer, born at Gloucester in 1802; died at Paris in 1875. Before he was of age he commenced business for himself in London as a maker of musical instruments, and in 1823 attracted the attention of men of science by the publication in Thomson's *Annals of Philosophy* of a paper entitled *New Experiments on Sound*. This was followed by a number of other papers, some of them describing inventions of his own, all of which are remarkable for their ingenuity and delicacy of mechanical construction. In 1834 Wheatstone was appointed professor of experimental philosophy in King's College, London, but he seldom lectured. In 1836 he exhibited at King's College experiments showing the velocity of electricity, which suggested to him the idea of applying his apparatus to telegraphing and in 1837, in conjunction with W. F. Cooke, he took out the first patent for the electric telegraph. He was a fellow of the Royal Society from the year 1836, and in 1868 he received the honor of knighthood. He was the author of numerous papers, chiefly contributed to the *Philosophical Magazine* and the *Journal of the Royal Institution*.

Wheel, an instrument of torture formerly employed in France and Germany, on which the criminal was placed with his face upwards and his legs and arms extended along the spokes. On the wheel being moved round the executioner broke the wretch's limbs by successive blows with a hammer or iron bar, and after a more or less protracted interval put an end to the sufferings of his victim by two or three severe blows, called *coups de grâce* (mercy strokes), on the chest or stomach, or by strangling him. In Germany its use lingered down till the beginning of the nineteenth century.

Wheel (hwēl), Persian. See *Persian Wheel*.

Wheel and Axle, one of the mechanical powers, which consists of a wheel round the circumference of which a string may be wound, having a small weight attached to its free end, and an axle whose circumference, being smaller than that of the wheel, will sustain a heavier weight at the end of the string which is wound upon it in the opposite direction to that of the string on the wheel.



Wheel and Axle.

Wheeler (hwēl'er), William Almon, vice-president of the United States, was born at Malone, New York, in 1819; died in 1887. He was for a time state senator, and was member of Congress 1861-63 and 1869-77. He opposed an increase of salary and returned the extra pay allotted him under the salary bill. He was the author of the 'Wheeler Compromise' of the Louisiana difficulties of 1875, and in 1876 was nominated by the Republican party for vice-president and elected under the decision of the Electoral Commission, serving through the Hayes administration.

Wheeler, Joseph, soldier and legislator, born at Augusta, Georgia, in 1836. He was graduated at West Point, and was appointed a brevet second-lieutenant of dragoons in 1859. He resigned April 22, 1861, entering the Confederate service as lieutenant of

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artillery; his promotion was rapid; from 1862 until the close of the war he commanded the cavalry corps of the Army of the West. During the war he was three times wounded and had sixteen horses shot under him. After 1881 till the Spanish war he was a member of Congress. He served with distinction in that war and subsequently served in the Philippines, and in 1900 was made a brigadier general in the regular army. He died June 25, 1906.

Wheeling (hwēl'ing), the largest city of West Virginia, the county seat of Ohio Co., on the Ohio River, 92 miles below Pittsburgh, with several branches of three railroad systems and many miles of trolley lines. There are large manufacturing interests producing iron, steel, tinplate, pipe, nails, machinery, tin cans, glass, enameled ware, stogies and other tobacco products, pottery, leather, etc. Wheeling is the center of a large coal industry, adjoining Belmont County, Ohio, the largest coal-producing county in that State, with mines employing 15,000 men. Natural gas is obtainable at low rates. Pop. 41,641.

Wheel-window, in Gothic architecture, a circular window with radiating mullions resembling the spokes of a wheel. See *Rose-window.*

Whelk (hwelk), a general name applied to various species of gasteropodous molluscs. The large or common whelk (*Buccinum undātum*) is found on the coast of Europe, and is distinguished by the shell having its canal notched, and the mouth or aperture of large size. The whelks are typically carnivorous molluscs, and possess long *odontophores* or tongues provided with siliceous or flinty teeth. These animals are largely used for food and bait.

Wherry (hwer'i), a light, shallow boat used in England, with seats for passengers, and plying on rivers.

Whetslate, See *Hone.*

Whewell (hū'el), WILLIAM, philosopher, was born at Lancaster, England, in 1794, and received his early education at the free grammar school of his native town, afterwards at Haversham Grammar School, whence he went to Trinity College, Cambridge. In due course he became fellow and tutor of his college. In 1828 he was elected professor of mineralogy. In 1832 he resigned this chair for that of moral philosophy, which he held till 1855, when he became vice-chancellor of the university. In 1841 he was nominated to the mastership of Trinity, and in this position labored earnestly and successfully to obtain for the natural and moral sciences a better recognized position among the studies of the university. He became fellow of the Royal Society in 1820, and was one of the first members of the British Association, of which he was president in 1841. He died in 1866. Among Whewell's multifarious writings may be mentioned the Bridgewater treatise, *Astronomy and General Physics, Considered with Reference to Natural Theology* (1833); *History of the Inductive Sciences* (1837); *Philosophy of the Inductive Sciences* (1840); *History of Scientific Ideas; Elements of Morality, including Polity* (1845); *On Liberal Education in General; Lectures on the History of Moral Philosophy in England* (1852); *Platonic Dialogues* (1859-61); and *Lectures on Political Economy* (1863).

Whey. See *Milk.*

Whidah-bird (hwid'a), a name given to weaver-birds of the genus *Vidua*, inhabiting Western Africa, and found in abundance in the kingdom of Dahomey, near *Whidah.* In size the Whidah-bird resembles a linnet or canary, and during the breeding season the male is supplied with long, drooping tail-feathers, giving it a graceful appearance.

Whig (hwig), in English history, the name which was from the time of Charles II to within little more than a generation ago applied to the political party that advocates such changes in the constitution as tend in the direction of democracy. The term is of Scottish origin, and various explanations of it are given. It was originally applied to the Covenanters of the southwest of Scotland. From Scotland the word was brought to England, where it was used as the distinguishing appellation of the political party opposed to the *Tories.* The term *Liberals* is now generally applied to the representatives of the party formerly known as Whigs. The Whig party in the United States stood opposed to the Democratic party from about 1835 to 1856, when the Northern wing of the Whigs merged in the new Republican party. See *Tory.*

Whin (hwin). See *Furze.*

Whin-chat, a passerine bird of the genus *Saxicŏla* or *Pratincŏla*, the *S.* or *P. rubetra.* It is common in Northern Europe during summer, frequenting broom and furze, on the highest twigs of which it perches, and

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occasionally sings very sweetly. It is closely allied to the stone-chat (which see).

Whipper-in, in fox hunting, one who keeps the hounds from wandering, and whips them in, if necessary, to the line of scent. In politics, one who enforces party discipline among the supporters of the government or opposition, and urges their attendance.

Whipple (hwip'el), EDWIN PERCY, essayist, was born at Gloucester, Massachusetts, in 1819; died in 1886. He contributed essays and critical articles to the reviews and magazines of his time, a collection of his articles, *Essays and Reviews*, being published in 1849. Other works were *Essays on Subjects Connected with Literature and Life*, and *Character and Characteristic Men*. He was esteemed as a lecturer, and published a volume of lectures on *Literature of the Age of Elizabeth*.

Whip-poor-Will, the popular name of an American bird, the *Chordeiles, Antrostŏmus*, or *Caprimulgus vocifĕrus*, allied to the European goat-sucker or night-jar, and so called from its cry. It is very common in the eastern parts of the United States; is about 10 inches long, and feeds on flying moths and other insects. Its note is heard in the evening, or early in the morning. During the day these birds retire into the darkest woods.

Whip Snake, the name given a species distinguished by its very slender back and tail, which has been compared to the thong of a whip, and long and narrow head, which ends in a protruding rostral shield or in a flexible snout. They are arboreal in habit, usually green in color, and feed on birds and lizards.

Whirlpool (hwerl'pōl), a circular eddy or current in a river or the sea produced by the configuration of the channel, by meeting currents, by winds meeting tides, etc., as those of Charybdis, the Maelstrom, and Corryvreckan.

Whirlwig, WHIRLWIG-BEETLE (*Gyrinus natātor*), a beetle which abounds in fresh water in the United States; may be seen circling round on its surface with great rapidity. Its eyes are divided by a narrow band, so that, although it has only two, it is made to look as if it had four.

Whirlwind (hwerl'wind), a violent wind moving in a spiral form, as if moving round an axis, this axis having at the same time a progressive motion. Whirlwinds are produced chiefly by the meeting of currents of air which run in different directions. When they occur on land they give a whirling motion to dust, sand, etc., and sometimes even to bodies of great weight and bulk, carrying them either upwards or downwards, and scattering them about in all directions. At sea they often give rise to water-spouts. They are most frequent and violent in tropical countries, and are common in an exaggerated form in the Central United States, where they are known under the name of Tornadoes.

Whiskey (hwis'ki; a corruption of the Gaelic word *uisge*, water, whiskey being called in Gaelic *uisge-beatha*, which signifies *water of life*), the name applied to an ardent spirit distilled generally from barley, but sometimes from wheat, rye, sugar, molasses, etc. There are two chief varieties of whiskey, viz., malt-whiskey and grain-whiskey. The former variety is of finer quality, and made chiefly from malted barley and sometimes from rye. The latter is made from sugar, molasses, potatoes, Indian corn, barley, oats, etc. See *Distillation*.

Whispering Gallery, Whispering Dome, a gallery or dome of an elliptical or circular form, in which faint sounds conveyed around the interior wall may be readily heard, while the same are inaudible elsewhere in the interior.

Whist (hwist), a well-known game at cards, first clearly described by Edmond Hoyle in his *Short Treatise on the Game of Whist* (1743). The game is played with the full pack of fifty-two cards by four persons, two being partners against the other two, each player receiving thirteen cards dealt out one by one in rotation. The last card dealt is turned face up, and is called the trump card; it gives a special power to the suit to which it belongs. The cards rank as follows: ace (highest), king, queen, knave, and the others according to their number of pips. Play is commenced by the person on the left hand of the dealer laying down a card face up on the table, the other players following in succession with cards of the same suit if they have them. When all have played the player who has laid the highest card takes the four cards laid down, which constitute a trick. The winner of the trick then leads, as the first of a new trick, the winner of which becomes the leader, and so on. When a player cannot play a card of the same suit, he may play one of the trump suit, and

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take the trick, or lay one of a different suit, which gives him no chance of winning the trick. When the hand is played out the score is taken as follows: the partners who conjointly gain the majority of tricks score one point for every trick taken above six. The ace, king, queen and knave of the trump suit are called honors, and count one each for the side who holds them; if one side hold three honors, they count two by honors, as the opposite side can have but one; if one side hold all the honors, four by honors is counted; should the honors be equally divided neither side counts, the honors being then said to cancel each other. In *long whist*, an obsolescent form of the game, ten of these points made a game. In *short whist*, the game now generally played, the number has been reduced to five or seven, and in this form it is common to count by tricks alone, honors not being counted. A rubber consists of a series of three games, and is won by the side that secures two of them. Should one party gain two games in succession, the third of the rubber is not played.

Whistler (hwist'ler), JAMES ABBOTT MCNEIL, artist, born at Lowell, Massachusetts, in 1834. He studied art in Paris and in 1855 went to England, where he spent the remainder of his life. His paintings attracted great attention and found ardent admirers and severe critics. His etchings are universally praised, and he is now looked upon as the greatest painter of his age. One of the most admired of them is a portrait of his mother. He is the author of the cuttingly satirical *Gentle Art of Making Enemies*. He died July 17, 1903.

Whiston (hwis'tun), WILLIAM, an English divine and mathematician, born in 1667; died in 1752. He studied at Clare Hall, Cambridge, where, having taken his degree in 1690, he was chosen a fellow of his college, and became an academical tutor. Entering into holy orders he was appointed in 1694 chaplain to the Bishop of Norwich. In 1696 he published a *Theory of the Earth* on the principles of the Newtonian philosophy; in 1698 became rector of Lowestoft; and in 1701 was appointed deputy-professor of mathematics at Cambridge by Sir Isaac Newton, who shortly afterwards resigned the professorship in his favor. He was expelled from the university in 1710 for Arian opinions, and the following year was deprived of his professorship. He then removed to the metropolis, and published his *Primitive Christianity*, which caused him to be prosecuted as a heretic, though the proceedings were ultimately terminated by an act of grace (1715). Towards the close of his life he became a Baptist. Among his latest labors were his *Memoirs of My Own Life* (1749-50). Besides numerous original productions he published a well-known translation of the works of Josephus.

White (hwit), ANDREW DICKSON, educator, born in 1832 at Homer, Cortland Co., New York, was graduated from Yale in 1853. He filled the position of president of Cornell University, was minister to Germany 1879-81, and was appointed ambassador there in 1897. Among his numerous works are *Outline of Lectures on History*, *The New Germany*, and *The Warfare of Science with Theology*.

White, EDWARD DOUGLASS, jurist, born in Lafourche parish, Louisiana, in 1845. He served through the Civil war in the Confederate army and was admitted to the bar of Louisiana in 1868. He was elected to the State senate in 1874, appointed a justice of the Louisiana Supreme Court in 1878, and was United States Senator from Louisiana 1891-94. In the latter year he was appointed an associate justice of the Supreme Court of the United States. In this position he showed great learning and efficiency, and on December 11, 1910, he was appointed by President Taft Chief Justice of the Supreme Court of the United States.

White, GILBERT, naturalist, born in 1720 at Selborne, England; died in 1793. He was educated at Oriel College, Oxford, of which he became a fellow in 1744. He declined all church preferment, but in his later years served as curate in his native village, in the beautiful rural scenery of which he spent the greater part of his days, occupying his leisure hours mainly with the study of natural history, in which he was a most assiduous and accurate observer. His *Natural History of Selborne* was published in 1789, and has retained a deserved and unimpaired popularity to the present day. Mr. White was also the author of letters on the antiquities of Selborne.

White, HENRY KIRKE, poet, born at Nottingham, England, in 1785. He was the son of a butcher, but being of a delicate constitution he was put to the trade of stocking weaving. From his infancy he manifested great love of learning, and at the age of fourteen produced some notable specimens of poetry. He published, in 1803, a poem called *Clifton Grove;* and after his death

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his *Remains*, consisting of poems, letters, etc., were edited by Southey. He died in 1806.

White, RICHARD GRANT, author, was born in New York city, May 22, 1821. His literary tendencies drew him from law, and his musical, dramatic and art criticisms gave him prominence. He occupied a place among the most learned Shakespearean scholars. He died in 1885.

White, WILLIAM, Protestant Episcopal bishop, was born in Philadelphia, in 1748. He was ordained priest in 1772, and subsequently became rector of Christ Church and St. Peter's Church, Philadelphia. During the Revolution Dr. White sided zealously with the colonies. In 1786 he was elected Bishop of Pennsylvania, being consecrated in Lambeth palace, England, in 1787. He lived to see the Episcopal Church thoroughly organized in the United States, he consecrating eleven bishops. He died in 1836.

White, WILLIAM HALL, an English novelist who, under the pen name of 'Mark Rutherford,' has written *The Revolution in Fanner's Lane*, *Clara Hapgood*, etc., also *Spinoza's Ethics*.

White Ants. See *Termites*.

White-bait, a name for the young of the herring. It abounds in the Thames during the spring and summer, and is much prized by the Londoners. The English cabinet used to assemble at Greenwich previous to the prorogation of parliament in autumn to partake of a white-bait dinner.

Whiteboys, an illegal association formed in Ireland about 1760. The association consisted of starving day laborers, evicted farmers, and others in a like condition, who used to assemble at nights to destroy the property of harsh landlords or their agents, the Protestant clergy, and tithe collectors, or any others that had made themselves obnoxious in the locality. In many cases they did not confine their acts of aggression merely to plunder and destruction, but even went the length of murder.

White Cross, an organization similar in many respects to the famous Red Cross, from which it differs chiefly in the fact that it is distinctly American. It was founded in 1898 by Mrs. Jane Creighton, of Portland, Oregon, who became its first president. The motto of the organization is Truth, Charity and Philanthropy, and its purposes include not only the caring for the wounded and sick American soldiers and sailors, but the aiding of the widows and orphans of those who are killed in battle or die of disease or accident.

White Elephant, an elephant affected with albinism. Such animals appear to have been known to the ancients. They are highly esteemed by some Eastern potentates, and are considered sacred in Siam. A specimen purchased by the late P. T Barnum from King Theebaw, of Burma, was brought to the United States in 1884, but the genuineness of this is very doubtful. It is generally reported that when the King of Siam desires to ruin anyone he makes him a present of a white elephant. The sacred elephant has an enormous appetite, and, being sacred, it is a crime to let it die, so that the gift generally entails financial ruin on the recipient.

Whitefield (hwit'fēld), GEORGE, founder of the Calvinistic Methodists, was born in 1714 at Gloucester, England. At the age of eighteen he entered as servitor at Pembroke College, Oxford, where he became acquainted with the Wesleys, and joined the small society which procured them the name of Methodists. (See *Methodists* and *Wesley*.) He was ordained deacon in 1736, and soon became very popular as a preacher. In 1738 he went to the American settlement of Georgia, where his ministrations gave great satisfaction to the colonists. In the following year he returned to England to procure subscriptions for building an orphan house in the settlement. Having taken priests' orders, he repaired to London, where the churches in which he preached proved incapable of holding the crowds who assembled to hear him. He now adopted preaching in the open air, and visited various parts of the country, addressing vast audiences. In 1739 he again embarked for America, and made a tour through several of the colonies, preaching with great effect to immense crowds. He returned to England in the following year, where for a time differences between him and Wesley deprived him of many followers. After visiting many parts of England, Scotland, and Wales he again returned to America, and remained there nearly four years. Soon after his return he was introduced to the Countess of Huntingdon, who made him one of her chaplains. A visit to Ireland and two more voyages to America followed, and for several years his labors were unremitting. At length, on his seventh

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visit to America, he died at Newburyport, Mass., in 1770.

Whitefish, a fish of the salmon family (*Coregonus albus*), found abundantly in the Great Lakes, and in some American rivers. It is 15 to 20 inches long, bluish-gray above and white below. It is caught in large numbers and is esteemed as a food fish.

Whitehall (hwīt'hąl), a locality in Westminster, where are the admiralty office, and that of the commander-in-chief (the Horse Guards), etc. (See *London.*) On the bank of the Thames was a palace called Whitehall, built before the middle of the thirteenth century. In 1530 it became the residence of the court, but in 1697 was destroyed by fire, excepting the Banqueting Hall, added by James I, according to a design of Inigo Jones, in 1619.

Whitehaven (hwīt'hāvn), a parliamentary borough and seaport of England, in Cumberland, situated on a bay of the Irish Sea, has a good harbor and dock, and enjoys a considerable shipping trade. Iron ship-building is carried on, and there are blast-furnaces and iron and brass foundries. Pop. 19,048.

Whitehorse, a river port of the Yukon Territory, Canada, situated on the Yukon River at the foot of Whitehorse Rapids, the head of navigation of the Yukon River 456 miles from Dawson City and 110 miles from Skagway, Alaska. It is in the center of the copper belt, at the head of the trail connecting the Shushana gold district of Alaska with the steamer and rail service. Pop. (1911) 727.

White-lead. See *Ceruse.*

White Lady, The, a figure in German, English and Scotch folklore, a supernatural visitant supposed to haunt certain places and to be seen on particular occasions. It dates from the sixteenth century, being first seen at Rosenberg, in Bohemia.

White Mountains, a group of mountains in New Hampshire, belonging to the Alleghenies. They have fine scenery and are a favorite summer resort. The culminating point is Mount Washington, 6288 feet.

White Oak, a species of oak, the Quercus alba, a native of the United States and of parts of Canada.

White Pine, the *Pinus Strobus*, one of the most valuable and interesting species of pines, common to the northern parts of the United States and Canada. It is widely used in carpentry. See *Pine.*

White Plains, a village, county seat of Westchester Co., New York, 10 miles north of New York City, the birthplace of the State of New York, and scene of the Battle of White Plains, 1776. It is chiefly a residential village, containing many beautiful homes. Pop. 20,000.

White River, (1) a river of Arkansas, with a course of 800 miles. It joins the Mississippi above the influx of the Arkansas river, and has several important affluents. Together with its tributaries it affords 500 miles of boat navigation. (2) A river in Indiana, formed by the confluence of the East and West Forks, emptying into the Wabash near Mount Carmel.

White Sea, a large gulf of the Arctic Ocean, penetrating into Northern Russia to the distance of between 300 and 400 miles. It has an area of about 47,000 square miles, with a coast-line of 1000 miles. It is navigable only from the middle of May to the end of September.

White Slave Traffic, the term applied to the business of organized vice, which is now attracting widespread attention. The report of the Chicago Vice Commission throws light on the financial aspect of prostitution, and conditions in Chicago may be taken as typical of conditions in every important city. According to conservative estimates, the annual profits from prostitution in Chicago are $16,000,000 and the number of persons devoting their time exclusively to the business of organized vice about 5000. In the opinion of John D. Rockefeller, Jr., who has developed a Bureau of Social Hygiene, the prostitutes are in the majority of cases 'merely tools in the hands of men.' Economic conditions, it is believed, render easy the procuring of girls.

White Swelling, the popular name for all severe diseases of the joints resulting from chronic inflammation in the bones, cartilages, or membranes constituting the joint. Among the diseases known under this name are: (*a*) acute or chronic inflammation of the synovial membrane; (*b*) pulpy thickening of the synovial membrane; (*c*) ulceration of the cartilages; (*d*) scrofulous diseases of the joints beginning in the bones.

White-throat, a small singing bird of the family of warblers. The common white-throat (*sylvia undāta*) attains a length of 5

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inches, frequents gardens and hedges, and is a regular summer visitor to Northern Europe.

Whitgift (hwit'gift), JOHN, Archbishop of Canterbury, was born at Grimsby in 1530, and completed his education at Cambridge under Ridley and Bradford. He imbibed from his uncle, Abbot Whitgift, opinions that inclined him later to the side of the Reformation; but by a cautious reserve he escaped persecution during the reign of Queen Mary, and on the accession of Elizabeth was ordained priest. He held successively many posts at Cambridge, including the mastership of Pembroke Hall and Trinity College, and the regius professorship of divinity. In 1577 he was appointed bishop of Worcester, and on the death of Grindal (1583) was raised to the primacy. He had always been a rigid disciplinarian; but he now became an inquisitor, insisted on new articles of subscription, suspended the clergy who refused them, and in every way acted as the intolerant ecclesiastic. He took a leading part in the conference at Hampton Court under James I, and died soon after, in 1604.

Whiting (hwit'ing; *Merlangus merlangus*), a well-known fish belonging to the cod tribe. It abounds in the seas of Northern Europe generally, and exceeds all the other fishes of its tribe in its delicacy and lightness as an article of food. The American whiting is known as the hake.

Whiting, a town of Lake Co., Indiana, near Lake Michigan, 17 miles S. E. of Chicago. Its industries include wire-fence, paints, lumber, etc. Pop. 6587.

Whiting-pout, a British fish of the cod family (*Morrhua lusca*). See *Bib.*

Whitlock (hwit'lok), BRAND, American author and statesman, born in Urbana, Ohio, March 4, 1869. He engaged in newspaper work, studied law, was admitted to the Illinois bar in 1894 and to the Ohio in 1897. In 1905 he was elected mayor of Toledo as Independent against four other candidates, served four terms and refused the fifth. In December, 1913, he was appointed by President Wilson U. S. minister to Belgium. His published works include *The Turn of the Balance* (1907), *Forty Years of It* (1914), etc.

Whitlow (hwit'lō), in surgery, is an inflammation affecting the skin, tendons, or one or more of the finger bones, and generally terminating in an abscess. There is a similar disorder which attacks the toes. Whitlows differ much in their depth and extent. The usual exciting causes of whitlows are pricks, contusions, etc. They often occur without any apparent cause, but are always preceded by the entrance of bacteria through a wound.

Whitman (hwit'man), a village of Plymouth Co., Massachusetts, 21 miles S. of Boston. Its manufactures include boots and shoes, leatherboard, tacks, etc. Pop. 7292.

Whitman, CHARLES SEYMOUR, American jurist and statesman, born at Norwich, Connecticut, August 28, 1868. He was admitted to the bar in 1894 and began the practice of law. In 1901 he was appointed assistant corporation counsel of New York City; in 1904 president of the Board of City Magistrates; in 1907 judge of the Court of General Sessions; in 1910 district attorney of New York City; and in 1914 he was elected governor of New York on the Republican ticket.

Whitman, MARCUS, pioneer, born at Rushville, New York, in 1802. He emigrated to the Pacific coast in 1836, to serve as a missionary, and in 1843 made a visit to the East, riding over 3000 miles on horseback through the Rocky Mountain region in winter, and suffering great hardships. His purpose was said to have been to acquaint the government with the value of the Oregon country, but later criticism seemed to show that it was not political. He was killed by Indians in 1847.

Whitman, WALT, poet, was born at West Hills, Long Island, New York, in 1819. In his earlier years he was an errand boy and printer, and subsequently a school teacher, editor, and general writer for the press. He was founder of the Long Islander and editor of the Brooklyn Eagle. Previous to the Civil war he took an extended Southern trip. During the war Whitman gave devoted service in the hospitals of Virginia and Washington. This irretrievably ruined his great physical health. In 1873 he was stricken with paralysis at Washington and went to Camden, N. J., where he lived till his death, March 26, 1892. He had been a clerk in the period from the war to 1874. The first edition of his poetic volume, *Leaves of Grass*, then quite small, was issued in 1855. There have been numerous subsequent editions, each one with added pages, the last in December, 1891, under his own supervision. His entire published works now appear in ten volumes—*Leaves of Grass*, containing all the poems, and *Prose Works*, including *Specimen Days and Collect*. He discarded rhyme and metrical uniformity in his poems, and while possessed of great poetical ability failed to gain wide popularity, largely because he insisted on introduc-

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ing in his poems sexual subjects tabooed in ordinary polite society.

Whitney (hwit'ni), ADELINE DUTTON (Train), author, born in Boston, Massachusetts, in 1824. Wrote *Faith Gartney's Girlhood, The Gayworthys, Leslie Goldthwaite's Life, Ascutney Street,* etc. She died in 1906.

Whitney, ELI, inventor, born at Westborough, Massachusetts, in 1765, and educated at Yale College, where he was graduated in 1792. Going then to Georgia as a teacher, he invented the machine since known as the cotton gin, its purpose being to separate the cotton from the seed, thus greatly cheapening the production of this important fiber. Returning to the North he started business in conjunction with a man named Miller as a manufacturer of cotton gins. But his invention was pirated and the profits of the business, together with $50,000 voted to him by the State of South Carolina, were swallowed up in his lawsuits in defense of his rights. He subsequently went into the manufacture of firearms, for which he received a government contract, and in this way made a fortune. He died in 1825.

Whitney, WILLIAM DWIGHT, a distinguished philologist, born in 1827, at Northampton, Massachusetts, studied at Williams College, Williamstown, and at Yale College, giving special attention to Sanskrit language and literature. He also studied Sanskrit in Germany from 1850 to 1853, returning in the latter year to America. The first-fruits of his studies in Sanskrit was an edition of the *Atharva-Veda* in conjunction with Roth (1856). He had previously (1854) been made professor of Sanskrit and of comparative philology at Yale College. Among his independent works may be mentioned *Language and the Study of Language* (1867), *Oriental and Linguistic Studies* (1872-74), *Life and Growth of Language* (1875), *Sanskrit Grammar* (a highly important work), *German Grammar,* etc. He was editor of the great *Century Dictionary of the English Language.* He died in 1894. His brother, JOSIAH DWIGHT WHITNEY, became in 1865 professor of geology in Harvard University and published a number of works on geology.

Whitstable (hwit'stā-bl), a seaport of England, county of Kent, 6 miles by rail W. N. W. of Canterbury, of which it is the port. It has extensive oyster fisheries. Pop. 7984.

Whitsuntide (hwit'sun-tīd). See *Pentecost.*

Whittier (hwit'i-er), JOHN GREENLEAF, poet, was born of Quaker parents in 1807 at Haverhill, Massachusetts, and educated at the academy of his native place. In his younger days he worked on his father's farm and learned the shoemaking trade, but early began to write for the press, and in 1831 published his first work, *Legends of New England,* in prose and verse. He carried on the farm himself for five years and in 1835-36 he was a member of the legislature of Massachusetts. After having edited several other papers he went to Philadelphia to edit the *Pennsylvania Freeman,* an antislavery paper, the office of which was burned by a mob in 1839. In the following year he returned to his native state, settling in Amesbury, where (or at Danvers, Mass.) he afterwards chiefly resided. Among the numerous volumes of poetry which he from time to time gave to the world the following may be mentioned: *Moll Pitcher, Lays of My Home, The Voices of Freedom, Songs of Labor, Snow Bound, In War-time, National Lyrics, Ballads of New England, The King's Missive, Poems of Nature, St. Gregory's Guest,* etc. *At Sundown* was published after his death. Whittier's poems are distinguished by their freshness, their quiet power, and intense feeling. His nature poetry is faithful and beautiful, and his *Barclay of Ury* and *Barbara Frietchie* rank high among ballads of moral heroism. *My Psalm* is considered a masterpiece in the realm of spiritual thought. He died September 7, 1892.

Whittlesey (hwit'l-se), an old town of England, in the county of Cambridge, 6 miles east by south of Peterborough. Pop. 4207. About 4 miles southwest of the town was the shallow lake, Whittlesey Mere, now drained and the land reclaimed.

Whittredge (hwit'rej), WORTHINGTON, painter, born at Springfield, Ohio, in 1820. Among his best-known works are *The Old Hunting Grounds, The Pilgrimage to Saint Roche, The Rocky Mountains* and *The Old House by the Sea.* He died in 1910.

Whitworth (hwit'wurth), SIR JOSEPH, an English engineer, was born in 1803; died in 1887. After working as a journeyman in Manchester and London, he started business in the former city in 1833 as a manufacturer of engineers' tools, thus founding the firm of which he was long the head. He subsequently turned his attention to a uniform system of screw-threads, which was soon very generally adopted. This was followed by standard gauges, which have been universally accepted for engineering work. In 1854-55

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he began his experiments with firearms, which led to the production of the Whitworth rifle, and later brought him into competition with Armstrong as a manufacturer of rifled ordnance. He was also the originator of the fluid-pressed steel, used in the manufacture of cannon and ships' plates. He was created a baronet in 1869. The Whitworth scholarships, for the cultivation of theoretical and practical skill in mechanical and engineering arts, were founded by him in 1869. He was the author of *Guns and Steel* (1873).

Whooping-cough. See *Hooping-cough.*

Whorl (hwurl), in botany, a ring of organs all on the same plane.

Whortleberry (hwur'tl-ber-i; (*Vaccinium*), a genus of shrubbery plants, the type of the nat. order Vacciniaceæ, with alternate leaves, pink or red bell-like flowers, and berries of a dark purple, bluish, or red colour. The common whortleberry, bilberry, or blaeberry (*V. myrtillus*) is a hardy plant which grows in forests, heaths, and on elevated mountains. In some of the pine forests of Scotland the plant attains the height of 3 feet. The berries have a pleasant, sweet taste, and are used for making jelly. The berries of the red whortleberry (*V. Vitis-idæa*) are of a bright red color, and possess acid and astringent properties; from their similarity to cranberries they are sold as such in various parts of Scotland. (See *Cranberry.*) Whortleberries are generally known in the United States as huckleberries and blueberries and grow abundantly in mountain soil.

Whydah (hwi'da), a town of West Africa in the kingdom of Dahomey, on the Bight of Benin. Pop. about 20,000.

Whydah-bird. See *Whidah-bird.*

Whymper (hwim'fer), EDWARD, traveler and artist, born in London in 1840. He is best known as a mountain-climber, and was the first to ascend the Matterhorn and Chimborazo. He published *Scramble Among the Alps, Travels Among the Great Andes of the Equator*, etc. He died in 1911.

Whyte-Melville, GEORGE JOHN, novelist, born in Fifeshire, Scotland, in 1821. He entered the army, and fought in the Crimean war. He first made himself known as a novelist in 1853, when he published *Digby Grand.* This was followed by *General Bounce, Kate Coventry, Market Harborough, The Gladiators, Sarchedon, Satanella, Holmby House, Bones and I*, etc. He was killed in the hunting-field in 1878.

Wiborg. See *Viborg.*

Wichita (wich'i-ta), a city of Kansas, situated at the junction of the Arkansas and the Little Arkansas River, in south central Kansas, at the junction of seven different lines. Wichita's history dates back only to 1872. It is the leading manufacturing and distributing center of the Southwest. It has packing houses, railroad shops, flouring mills, woodworking establishments, and other large enterprises. It is the largest implement and machinery distributing point in its territory. It has a number of educational institutions. Pop. 67,847.

Wichita Falls, capital of Wichita Co., Texas, on the Wichita River, about 95 miles N. W. of Fort Worth. It has grain and lumber interests. Pop. 8200.

Wick (wik), a seaport of Scotland, capital of the county of Caithness, at the head of the Bay of Wick, on the left bank of the river Wick, over which is a bridge connecting it with its suburb Pulteney-Town. It is the headquarters of the herring fishery of Scotland. Pop. 7911.

Wickliffe (wik'lif), WYCLIFFE, WICLIFF, WYKLYF, etc., JOHN, religious reformer, was born about 1320 at Hipswell, near Richmond, in Yorkshire. He was educated at Oxford; was

John Wickliffe.

elected master of Balliol College, and in 1361 was appointed rector of Fylingham, or Fillingham, in Lincolnshire. He afterwards became doctor of theology and teacher of divinity in the university:

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and for some time held the living of Ludgershall, in Buckinghamshire. Disputes existed at this period between Edward III and the papal court relative to the homage and tribute exacted from John, and the English parliament had resolved to support the sovereign in his refusal to submit to the vassalage. Wickliffe came forward on behalf of the patriotic view and wrote several tracts, which procured him the patronage of John of Gaunt, duke of Lancaster. In 1374 he was one of the commissioners sent by the king to Bruges to confer with the nuncio of Gregory XI respecting the statutes of provisors and præmunire. Shortly before Edward gave him the valuable rectory of Lutterworth, in Leicestershire, which he held till his death. Here he labored zealously and unweariedly as a preacher and pastor, though he lived at times also in Oxford or London. In some of his utterances he is said to have styled the pope Antichrist, charging him with simony, covetousness, ambition, and tyranny. His opinions began to spread, and the church grew alarmed. Courtenay, bishop of London, summoned him to appear before a convocation at St. Paul's. Wickliffe appeared there on February 19, 1377, attended by his friends, John of Gaunt (then the virtual ruler of England), Lord Percy, the earl-marshal, and others. Hot words passed between the bishop and the duke; blows followed; and the meeting broke up in confusion. In May following the pope addressed three bulls to the king, the primate, and the University of Oxford, commanding them to take proceedings against Wickliffe, who in answer to the prelate's summons appeared in the chapel of Lambeth. Proceedings were, however, stopped by order of the queen-mother, and Wickliffe was dismissed with simply an injunction to refrain from preaching the obnoxious doctrines. About this time he was engaged in translating the Bible from the *Vulgate* with the assistance of some of his friends. In 1381 he publicly challenged the doctrine of transubstantiation, and his heresies were condemned by the theologians of Oxford, as well as by a provincial council called by Archbishop Courtenay and held at the Blackfriars, London, in 1382. Wickliffe was proclaimed a heretic, his works were condemned to be burned, and some of his followers were imprisoned; but he was allowed to retire unmolested to his rectory of Lutterworth. A stroke of paralysis terminated his life on the 31st of December, 1384. About thirty years after his death his doctrines were condemned by the Council of Constance, and in 1428 his remains were dug up, burned, and the ashes cast into the Swift. The influence of his doctrines spread widely on the Continent, and may easily be traced in the history of the Reformation. Wickliffe was the author of an enormous number of writings in Latin and English, and he ranks undoubtedly as the father of English prose. Many of his writings still remain in MS., and it was not until 1850 that the whole of his Bible appeared.

Wicklow (wĭk'lō), a maritime county of Ireland, in the province of Leinster, bordering on the Irish Sea; area 781 sq. miles. The coast is mostly precipitous. The surface is diversified and picturesque, rising into mountain-groups, the loftiest of which is Lugnaquilla, 3039 feet high, and intersected by deep and romantic valleys. Its minerals include a little gold in the streams, lead and copper ores, and pyrites in considerable quantities. The principal rivers are the Slaney, Vartrey, and Avoca. It is mainly a pastoral county. Pop. 60,824.— WICKLOW, the county town, is at the head of a small bay and is a sea-bathing resort. Pop. 3288.

Widdin, or VIDIN (vi'den), a town of Bulgaria, on the right bank of the Danube. Ships can reach the town at high-water, and there is a considerable trade, chiefly in corn, wine and salt. Widdin was formerly strongly fortified. Pop. 14,551.

Widgeon, or WIGEON (wij'un), a species of natatorial bird allied to the Anatidæ or ducks; the *Marĕca penelŏpe*. It breeds in the Arctic regions, and is common in northern Europe in winter. The American widgeon is the *Marĕca Americāna*. It is most abundant in the Carolinas and is often called *bald-pate*, from the white on the top of the head.

Widnes (wid'nes), a thriving manufacturing town of England, county of Lancaster, on the Mersey (here crossed by a magnificent iron-girder bridge), 13 miles E. S. E. of Liverpool by rail. There are extensive chemical works, copper-smelting works, rolling-mills, iron-foundries, etc. Pop. 31,544.

Widow-bird. See *Whidah-bird.*

Wieland (vē'lânt), CHRISTOPH MARTIN, a German romancist and poet, born in 1733; died in 1813. He was educated at the University of Tübingen; was appointed professor of philosophy in 1769 at Erfurt; and three years afterwards went to Weimar as teacher to the sons of Duchess Anna

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Amalie. Here, or in the immediate neighborhood, he resided till his death, being a member of the circle to which Goethe, Schiller, and Herder belonged. The early period of his literary life was devoted to pietistic or at least serious poetry such as *The Nature of Things* (1752), *Twelve Moral Letters in Verse Anti-Ovid* (1752), *The Trial of Abraham's Faith* (1753); in the second period he produced the romances *Agathon* (1766), and *Don Sylvio de Rosalva* (1764), the poem *Musarion* (1768), and a prose translation of Shakespeare in eight vols. (1762–66); while in the third and ripest period were written the romantic epic of *Oberon* (1781); *History of the Abderites* (1781); *The Republic of Fools, London* (1861); *The Secret History of Peregrinus Proteus* (1791), etc. He also published translations of Horace, Lucian, and the *Letters of Cicero.*

Wieliczka (vyel-ich'kâ), a town in Austria, Galicia, situated 8 miles southeast of Cracow, and noted for its extensive salt mines. Pop. 6012.

Wiener-Neustadt (vē-nér-noi'stât), a town of Austria, 25 miles s. of Vienna. It was almost entirely destroyed by fire in 1834, but a number of interesting mediæval buildings yet remain. There are important manufactures of locomotives, machinery, pottery, leather, etc. Pop. 28,458.

Wiesbaden (vēs'bä-dèn), a town in Prussia, province of Hesse-Nassau, finely situated at the foot of Mt. Taunus, in the valley of the Salzbach, about 2 miles from the Rhine. It is noted for its medicinal saline springs (the temperature of the Kochbrunnen being 156° F.), and it attracts annually upwards of 60,000 visitors. The chief buildings are the Kursaal, a new townhouse, an old and a new palace, library, museum, English church, and other churches, theater, etc. Pop. (1910) 109,033.

Wife. See *Marriage.*

Wig, an artificial covering of hair for the head, used generally to conceal baldness, but formerly worn as a fashionable means of decoration. Formally curled wigs are still worn professionally by judges and lawyers in Great Britain, and wigs are commonly used in making up for the stage.

Wigan (wig'an), a municipal and parliamentary borough of Lancashire, England, on the Douglas, 21 miles northeast of Liverpool. Wigan stands in the center of an extensive coal field, and its manufactures, which are important, consist chiefly of calicoes, fustians, and other cotton goods, linens, checks, cotton twist, etc., besides iron-foundries, iron-forges, railway-wagon works, iron-rolling mills, large breweries, chemical works, and corn and paper mills. Pop. (1911) 65,528.

Wiggin (wig'in), KATE DOUGLAS, author, was born at Philadelphia in 1857. The daughter of R. N. Smith, she married Mr. Wiggin in 1880, and in 1891, after his death, C. N. Riggs. She engaged in kindergarten work on the Pacific coast, and wrote a series of highly popular juvenile tales, including *Timothy's Quest, The Story of Pansy, The Birds' Christmas Carol,* etc.

Wight (wit), ISLE OF, an island off the south coast of England, in the county of Hants, separated from the mainland by Spithead and the Solent; 23 miles in length, 13 miles broad; area, 147 sq. miles. A range of chalk downs, which cross the island from east to west and form excellent sheep-walks, separate it into two districts somewhat different in character. The general appearance is picturesque, and the geology of the island is interesting. The air is remarkably mild, and the district known as the Undercliff, lying along the south coast, and completely sheltered from the north, has long been a resort for invalids. The chief towns are Newport (the capital), Ryde, Cowes, Ventnor, Bembridge, Freshwater, Yarmouth and the fashionable health resorts of Sandown and Shanklin. Near Cowes is Osborne House, a favorite residence of the late Queen Victoria. Carisbrooke Castle is an interesting ruin. Pop. 88,193.

Wigtownshire (wig'tun-shīre), the southwesternmost county of Scotland; area, 491 sq. miles. The coast is indented by numerous deep and spacious bays, of which Wigtown Bay, Luce Bay and Loch Ryan are the most important. The chief rivers are the Cree and Bladenoch, both partially navigable. It is mostly a dairying country. Pop. 32,685. Stranraer is the largest town and Wigtown the capital.

Wigwam (wig'wam), an Indian cabin or hut, so called in the United States and Canada. These huts are generally of a conical shape, formed of bark or mats laid over stakes planted in the ground and converging at top, where is an opening for the escape of the smoke.

Wilberforce (wil'ber-fōrs), SAMUEL, an English prelate, son of William Wilberforce, the philanthropist, was born at Clapham in 1805; was graduated from Oriel College, Oxford; was

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appointed curate of Checkendon (1828) and became dean of Westminster and bishop of Oxford in 1845. He was the leader of the High Church party, and the author of *Note-book of a Country Clergyman* (1833), *Eucharistica* (1839), *A History of the Protestant Episcopal Church in America* (1844), a volume of *University Sermons*, and numerous other works. He was killed by a fall from his horse in 1873.

Wigwams of North American Indians.

Wilberforce, WILLIAM, a celebrated English philanthropist, was born at Hull in 1759; died in 1833. After completing his education at St. John's College, Cambridge, he was, in 1780, elected member of parliament for his native town; and in 1784 was returned by the county of York. In 1786 he made the acquaintance of Clarkson (see *Clarkson, Thomas*), who gained his sympathies on behalf of the agitation against the slave trade. In 1791 he moved for leave to bring in a bill to prevent further importation of African negroes into the British colonies. Year after year he pressed this measure, but was always defeated till 1807, when it was passed during the short administration of Fox. He then devoted his energies to bring about the total abolition of slavery, and three days before his death he was informed that the House of Commons had passed a bill which extinguished slavery in the British colonies.

Wilcox, ELLA WHEELER, poetess, born at Johnstown Center, Wisconsin, in 1858. She has written much creditable verse, contributing to current periodicals, and publishing *Poems of Passion, Poems of Pleasure, Drops of Water*, etc.; also a number of novels.

Wilde (wīld), OSCAR, poet and dramatist, born at Dublin, Ireland, in 1856, son of Sir William Wilde, an eminent Irish surgeon and writer on medical subjects. His mother was a poetess. He was a pupil of Ruskin, and after his college days became noted for eccentricities in dress and manner. He wrote ably, producing *Poems, The House of Pomegranates, Lady Windermere's Fan*, a play, *Dorian Gray*, a novel, and various other works. In 1896 he was sentenced in London to two years' imprisonment for vicious practices. He died November 30, 1900.

Wilhelmina (wil-hel-mē'na), HELENE PAULINE MARIE, Queen of the Netherlands, only child of William III by his second wife, was born at The Hague, August 31, 1880. Her mother was regent until August 31, 1898, in which year she was crowned. In 1901 she married Duke Henry of Mecklenberg-Schwerin. The people of the Netherlands were very anxious for an heir to the throne, and this anxiety was satisfied by the birth of a daughter in 1909.

Wilhelmshaven (vil-helms-hä'ven), a great naval station belonging to Germany, on the w. side of the Jade, an inlet of the North Sea. The entrances to the harbors are sheltered by long moles, the whole town is strongly fortified, and there are numerous docks, building-slips, etc. Pop. (1905) 26,012. See *Jade*.

Wilhelmshöhe. See *Cassel*.

Wilkes (wilks), CHARLES, naval officer, born in New York City, April 3, 1798; entered the navy in 1816 and became a lieutenant in 1826. In 1838 he commanded an exploring expedition sent by the United States government to the Antarctic regions. Here he discovered what he claimed to be an Antarctic continent, sailing far along its coast. He completed a voyage around the world, returning in 1842 and publishing an account of his explorations. In 1861, while in command of the *San Jacinto*, he intercepted the British steamer *Trent* and took as prisoners J. M. Mason and J. Slidell, Confederate commissioners to Europe, an event that produced a great sensation and threats of war in England. In 1862 he was promoted commodore, after which he commanded a squadron in the West Indies. In July, 1866, he was made a rear-admiral. He died February 8, 1877.

Wilkes, JOHN, political agitator, born in London in 1727; died in 1797. He was the son of a rich distiller, and was educated for some time at Leyden. He was returned to parliament as a member for Aylesbury (1757), and attained considerable notoriety by the

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publication of a paper entitled the *North Briton*, in No. 45 of which (1763) he commented severely on the king's speech to parliament. The home secretary in consequence issued a general warrant, upon which Wilkes, with others, was apprehended and committed to the Tower, but released by Chief Justice Pratt, who declared the prosecution illegal. On the next meeting of parliament, however, a special law was passed to sanction his prosecution, and in 1764 he was expelled from the House of Commons. As he had by this time withdrawn to France and did not appear to receive sentence, he was outlawed. He returned, however, to England at the election of 1768, and was sent to parliament as representative of Middlesex, but was expelled from the House and committed to prison. Three times after this he was reëlected within a few months by the same constituency, but the House of Commons persisted in keeping him out, giving rise to a formidable agitation in favor of 'Wilkes and liberty.' He was released from prison in 1770, having been elected alderman of London, and he was next appointed sheriff of Middlesex, lord-mayor of London, and again (1774) member of parliament for Middlesex. On this occasion he was allowed to take his seat, and in 1782 the resolutions respecting the Middlesex election were expunged from the journals of the House of Commons. He published many speeches and pamphlets, and his correspondence was published after his death.

Wilkes-Barre (wilks'ba-re), a city, capital of Luzerne Co., Pennsylvania, on the east bank of the north branch of the Susquehanna River, about 140 miles northwest of Philadelphia. It is the center of rich anthracite coal field, and has manufactures of machinery, locomotives, cars, mining engines and tools, iron castings, wire ropes, lace, silks, tinware, lumber, cutlery, brewery products, axles, springs, adding machines, tobacco, etc. Pop. 67,105; within 8-mile radius, 245,000.

Wilkie (wil'kē), Sir David, one of the most famous painters of the British school, was son of the minister of Cults, near Cupar, Fifeshire, born there in 1785; died at sea off Gibraltar in 1811, while returning from a visit to Palestine. He received his early art training at the Trustees' Academy, Edinburgh; entered the schools of the Royal Academy, London, in 1805; first exhibited there (1806) *The Village Politicians*, which at once established his reputation; was elected an associate of the Academy in 1809, and in 1811 became an academician. In 1825, owing to ill health, he made an extended tour through Italy, Germany, and Spain. In the latter country his style as a painter underwent a marked change when he came under the influence of Velasquez and Murillo. Returning after three years to England, he was appointed (1830) painter in ordinary to the king, and was knighted in 1836. His pictures, such as the *Blind Fiddler*, *Rent Day*, *Cut Finger*, *Rabbit on the Wall*, *Penny Wedding*, *Cotter's Saturday Night*, *Duncan Gray*, *Blind Man's Buff*, *Chelsea Pensioners Reading the Gazette of Waterloo*, *John Knox Preaching before the Lords of the Congregation*, etc., are well known

Sir David Wilkie.

as engravings. These belong for the most part to his early and best period, when his method was characterized by subdued coloring and minute and spirited drawing. His later and less successful style is distinguishable by a breadth of treatment which sometimes shows looseness in drawing, and deals chiefly with historical subjects. It is represented by *The Entrance of George IV into Holyrood*, *The Spanish Council of War*, *The Maid of Saragossa*, *Napoleon and Pius VII.*

Wilkins, Mary Eleanor, novelist, born at Randolph, Massachusetts, in 1862. She produced graphic stories of New England life, and published *A Humble Romance*, *The Wind in the Rose Bush*, *Dr. Gordon*, *Pembroke*, *Jerome*, etc. She married Dr. O. M. Freeman in 1902.

Wilkinsburg, a borough in Allegheny Co., Pennsylvania, 7 miles E. of Pittsburgh, many of whose business people reside here. Pop. 18,924.

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Wilkinson (wil'kin-sun), SIR JOHN GARDNER, a distinguished English archæologist, born in 1797; died in 1875. He was educated at Harrow and Exeter College, Oxford, and afterwards resided twelve years in Egypt. As the result of his investigations there he published the *Manners and Customs of the Ancient Egyptians* (five vols. 1837-41). His other works are: *A Handbook for Travelers in Modern Egypt* (1847), *A Popular Account of the Ancient Egyptians*, *Dalmatia and Montenegro* (1848), and *The Egyptians under the Pharaohs* (1857).

Will, THE, is usually described as one of the three faculties by means of which the human mind finds expression, the other two being thought (or intellect) and feeling (or emotion). It is the faculty by which a choice is made between two courses of action, as distinct from the exercise of this power, which is more fitly described as volition. This faculty of the will, in the maturity of its complex power, is usually conceived as having been educated by a process of sensation; pleasure and pain giving rise to the motives by which the active determining energy is set in motion. Yet the exact relation between will and motive, the question whether the motive governs the will or the will determines the motive, has never been authoritatively settled. Thus the 'freedom' of the will has, until now, been maintained as a metaphysical and theological belief in opposition to the doctrine of 'necessity.' Aristotle in his *Ethics* incidentally asserted the freedom of the will; with this the Stoics and Epicureans agreed; as did also Justin Martyr, Origen, and St. Augustine; while its later adherents were Reid, Stewart, Kant, and Hamilton. On the contrary, among the early Christians, the Gnostics denied the freedom of the human will; so also did Spinoza; while the more modern advocates of the doctrine of 'necessity' were Hobbes, Hume, Jonathan Edwards, and John Stuart Mill.

Will, or TESTAMENT, in law, the legal declaration of a man's intentions as to what he wills to be performed after his death in relation to his property. In England, as also in its colonies and most of the United States, no will, whether of real or personal estate, is valid unless it be in writing, and signed at the foot or end by the testator, or by some person in his presence, and by his direction. Such signature must be made and the document acknowledged as his will by the testator in the presence of two or more witnesses at the same time, and such witnesses must attest and subscribe the will in the presence of the testator.

Willard (wil'ard), FRANCES ELIZABETH, born near Rochester, New York, in 1839. Was the author of a number of works and lectured on her travels in Europe, Egypt and Palestine. She was best known in connection with temperance work, and for her active labors in this cause. She became president of the Woman's Christian Temperance Union in 1879; founded the World's Woman's Christian Temperance Union in 1883 and was its president from 1888 until her death, February 18, 1898.

Willenhall (wil'en-hal), a town of England, in West Staffordshire, 12 miles N. W. from Birmingham. There are brass and iron foundries, but the staple industry is in locks and padlocks. Pop. 18,858.

Willesden (wilz'dn), a parish in Middlesex and suburb of London, 7 miles N. W. of St. Paul's. It is also a local government district and contains parts of Kilburn, Kensal Green, etc., and an important railway junction. Pop. 154,267.

Willet (wil'et; *Symphemia semipalmata*), a bird of the snipe family found in America. It is a fine game bird, and its flesh and eggs are prized for food. Called also *stone curlew*.

William I (wil'yam), surnamed the *Conqueror*, King of England and Duke of Normandy, born in 1027, was the natural son of Robert, duke of Normandy, by Arlotta, the daughter of a tanner of Falaise. His father having no legitimate son, William became the heir at his death, and ruled Normandy with great vigor and ability. The opportunity of gaining a wider dominion presented itself on the death of his second cousin, Edward the Confessor, king of England, whose crown he claimed. To enforce this claim he invaded England, and the victory of Hastings, in which his rival Harold was killed, ensured his success (1066). On his return to Normandy, however, the English, being treated by the Norman leaders like a conquered people, broke out in revolt, but William speedily returned and suppressed the insurrection. The resistance of two powerful English nobles, Edwin and Morcar, who had formed an alliance with the kings of Scotland and Denmark, and with the prince of North Wales, soon after drew William to the north, where he obliged Malcolm, king of Scotland, to do homage for Cumberland. In 1069 another insurrection broke out in the north, and at the same time the English resumed arms

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in the eastern and southern counties, only, however, to be suppressed with merciless rigor. He now established the administration of law and justice on a firm basis throughout England, conferred numerous grants of land on his own followers, and introduced the feudal constitution of Normandy in regard to tenure and services. He also expelled numbers of the English Church dignitaries and replaced them by Normans. Towards the end of his reign he instituted that general survey of the landed property of the kingdom, the record of which still exists under the title of *Domesday Book*. Although the English had been completely subdued, William had to suppress several formidable revolts by his own vassals, while in 1080 he was at open war with his son Robert. In 1087 he went to war with France, whose king had encouraged a rebellion of Norman nobles. He entered the French territory, and committed great ravages, but, by a fall from his horse at Mantes, received an injury which caused his death at the abbey of St. Gervais, near Rouen (1087).

William II, surnamed *Rufus*, from his red hair, third son of the preceding, was born in Normandy in 1056, and crowned at Westminster in 1087 on the death of his father. The Norman barons were discontented with this arrangement, and sought to make his eldest brother, Robert, king of England, but this project was defeated by William, who secured the aid of Lanfranc, archbishop of Canterbury, and the English nobles. Having repressed the conspiracy, he forced the Norman barons to withdraw to Normandy and confiscated their English estates. On the death of Lanfranc he also seized the estates connected with the vacant bishoprics and abbeys. In 1090 he sent an army into Normandy, while he himself crossed the Channel the following year. A reconciliation was effected between the two brothers, and in 1096 Robert mortgaged Normandy to his brother for a sum sufficient to enable him to join a crusade to the Holy Land. A characteristic incident in William's reign was his contention with Anselm, archbishop of Canterbury, regarding church property and the sovereignty of the pope. (See *Anselm.*) In 1100 he met his death while hunting in the New Forest, by an arrow shot accidentally or otherwise from the bow of a French gentleman named Walter Tyrrel.

William III, Stadtholder of Holland and King of England, son of William II of Nassau, prince of Orange, and Henrietta Mary Stuart, daughter of Charles I of England, was born at The Hague on the 4th of November, 1650. During his early life all power was in the hands of the grand pensionary John De Witt, but when France and England, in 1672, declared war against the Netherlands, there was a popular revolt, in which Cornelius and John De Witt were murdered, while William was declared captain-general, grand-admiral, and stadtholder of the United Provinces. In the campaign which followed he opened the sluices in the dykes and inundated the country round Amsterdam, thus causing the French to retire, while peace was soon made with England. In subsequent campaigns he lost the battle of Seneffe (1674) and St. Omer (1677), but was still able to keep the enemy in check.

William III.

In 1677 he was married, and the Peace of Nijmegen followed in 1678. For some years subsequent to this the policy of William was directed to curb the power of Louis XIV, and to this end he brought about the League of Augsburg in 1686. As his wife was heir-presumptive to the English throne he had kept close watch upon the policy of his father-in-law, James II, and in 1688 he issued a declaration recapitulating the unconstitutional acts of the English king, and promising to secure a free parliament to the people. Being invited over to England by some of the leading men he arrived suddenly at Torbay, November 5, 1688, with a fleet of 500 sail, and with 14,000 troops. Upon landing, a great part of the nobility declared in his favor, and in December

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James fled with his family to France, after which William made his entry into London. The throne was now declared vacant, the Declaration of Rights was passed, and on February 13, 1689, Mary was proclaimed queen and William king. Scotland soon afterwards followed England's example (with a partial resistance under Dundee); but in Ireland, whither Louis XIV sent James with an army, the majority of the Catholics maintained the cause of the deposed king, until they were defeated at the Boyne (1690) and at Aughrim (1691). In the war with France William was less successful; but although he was defeated at Steinkirk (1692) and Neerwinden (1693) Louis was finally compelled to acknowledge him king of England at the Peace of Ryswick in 1697. In 1701 James II died, and Louis XIV acknowledged his son as king of England. England, Holland, and the empire had already combined against Louis, and the war of the Spanish Succession was just on the point of commencing when William died, March 8, 1702, from the effects of a fall from his horse, his wife having already died childless in 1694.

William IV, King of Great Britain and Ireland, and third son of George III, born in 1765; died in 1837. He served in the navy, rising successively to all the grades of naval command, till in 1801 he was made admiral of the fleet. In 1789 he had received the title of Duke of Clarence, and in June, 1830, he succeeded his brother George IV to the throne. The great legislative events which render his reign memorable are the passage of the reform act, the abolition of slavery in the colonies, and the reform of the poor-laws. He married (1818) Adelaide, sister of the Duke of Saxe-Meiningen, by whom he had no surviving children, but by his connection with Mrs. Jordan, the actress, he had a large family.

William I, first German Emperor, and seventh king of Prussia, second son of Frederick William III, was born March 22, 1797. At an early age he began the study of military affairs; took part in the campaigns of 1813-14 under Blücher; married in 1829 Princess Augusta of Saxe-Weimar; became heir-presumptive to the throne of Prussia on his father's death in 1840; was commander of the forces which suppressed the revolutionary movement (1849) in Baden; was created regent in 1858; and on the death of the king, his brother, in 1861, succeeded to the throne of Prussia. During his reign Prussia defeated Denmark (1864), annexing the duchies of Schleswig-Holstein; quarreled with Austria, and engaged in a campaign which ended in the victory of Sadowa (1866); and went with the rest of Germany to war with France in 1870 (see *Germany* and *France*). In this war the operations of the Prussian generals were under the personal supervision of the king. The results of this war were so favorable for Germany that the German States combined in raising William to the imperial dignity, and he was proclaimed emperor of Germany at Versailles January 18, 1871, during the siege of Paris. He died March 4, 1888.

William II, ninth king of Prussia and third emperor of Germany, was born at Berlin, January 27, 1859, eldest son of the crown prince (afterward emperor) Frederick and Princess Victoria of England. After a careful training at home, the education of the young prince was completed in the gymnasium at Cassel, and he also received a thorough military training and full instruction in the arts of government and administration. An accident at birth caused a weakening of his left arm which became permanent, and in addition he has a serious affection of the ear, which so far has defied treatment. Yet, despite these afflictions, his ardent temperament led him to become a skilful horseman and a tireless hunter, as well as an enthusiastic yachtsman, and he is deeply interested in all kinds of army evolution. He married Augusta Victoria of Schleswig-Holstein-Augustinburg in 1881, and, after the brief reign of his father, succeeded to the imperial dignity on June 15, 1888. Since his accession he has shown himself a ruler of exuberant energy and has made himself felt as a vigorous power alike in his home government and in international European affairs. An exaggerated idea of the imperial dignity, embracing the exploded conception of the divine right of kings, was shown in the speeches of his early rule, and the intense energy with which he pushed forward the organization of the army and navy led to apprehensions of warlike purposes, while his later career has given warrant for the alarm to which his early actions and expression of views gave rise. His independence of action and decision of opinion soon led to strained relations with Prince Bismark, who had long been dominant in political affairs, the autocratic premier finding his authority greatly diminished by the resolute assertiveness of the strong-willed young emperor. A decided break came when William established a system of partial state-

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socialism, of which Bismarck strongly disapproved. This quickly led to the retirement of the able chancellor, and his replacement by Count Caprivi, a man more ready to yield to the emperor's views, or more in accord with them. Since that date several changes have taken place in the chancellorship. The foreign policy of the new regime led to a strengthening of the triple alliance between Germany, Austria and Italy, a weakening of the older bond between Germany and Russia, and to a colonial expansion indicated by Germany's taking an active part in the partition of Africa between the European powers. A large area of territory in the west, a second in the southeast, and a third in the Guinea region of that continent were won by Germany in consequence. In 1890 the island of Heligoland, in the German Sea, was ceded by England to Germany, in return for which England was granted certain advantages in Africa. In the negotiation of the treaty of peace between Turkey and Greece at the end of the war of 1897, William took a very prominent part, insisting that provision for payment of the defaulted interest due by Greece to foreign bondholders (mainly German) should form part of the terms of settlement. The treaty was made to accord with the emperor's views. In his internal administration, William has actively sought to establish a more pronounced personal government, a purpose in which he has met with strong parliamentary opposition. He has made himself a leader in European policies, and Germany, under his control, has advanced greatly in strength and political importance. He has also taken steps to placate the workingmen by establishing a system of old-age insurance under State auspices, and inaugurating other legislation in their favor. The great growth of Socialism has proved a disturbing element, and he has sought to repress it. William's plans for an increase of the army and navy, with the necessary additional taxation, on several occasions brought him into conflict with the Reichstag and long continued a source of alarm in Europe, especially in Great Britain. The result was a contest between these countries in the building of war vessels, the British government striving strenuously to maintain its supremacy and the German government increasing the strength of its navy at a disturbing rate. A conflict between William and the Reichstag took place in December, 1906, when that body opposed the emperor's views of maintaining a large garrison in German Southwest Africa, the result being that he ordered the dissolution of the parliament and a new election. He opened himself to drastic parliamentary criticism in 1910, in a speech at Königsberg, in which he reminded his hearers that his grandfather, William I, believed himself the chosen instrument of God and in possession of the crown by God's grace alone. The following words, with which he concluded, indicated that he entertained a similar opinion: 'Considering myself as the instrument of the Master, regardless of passing views and opinions, I go my way, which is solely devoted to the prosperity and peaceful development of the Fatherland.' These words were sharply controverted in the press and by the Socialists in the Reichstag. William throughout showed that he was one of the ablest and most energetic of ruling monarchs and one ready to maintain the political and commercial interests of his country to the verge of war. This was shown in his contest with France in 1905, on the Morocco question, in which war seemed imminent, and the renewal of this contest in 1911, at which date the hostile feeling was abated through the cession by France of a large area in Africa to Germany. To what extent William is responsible for the great conflict in Europe which began in July, 1914, and continued with unabated fury and frightful loss of life and property for more than two years, it is far from easy to estimate. The Entente powers accuse him of plunging Europe into war to gratify his ambition and give supremacy to Germany, and this sentiment is widely entertained in the United States. The final decision upon this subject must await the calm inquiry and full investigation of the days to come.

William the Lion. See *Scotland (History)*.

William the Silent, Count of Nassau and Prince of Orange, eldest son of William count of Nassau, was born in 1533, and was educated in the Roman Catholic faith. He had large estates in the Netherlands, and held high offices under Charles V and his son Philip II; but the reckless persecution of the Protestants roused him against the Spaniards, and when the Duke of Alva with a Spanish force was sent to subdue the Netherlands (1567), he retired to Germany. He now declared himself a Protestant, and personally led an army into Brabant against Alva, but failed to bring about an engagement. In 1572 the estates appointed the prince stadtholder of Holland, Zealand, Friesland and Utrecht, with power to prosecute the

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war against Spain. In 1574 the prince's brothers, Louis and Henry, were defeated and killed in a battle at Mookerheide, but this disaster was to some extent compensated by the raising of the siege of Leyden. In 1576 the brutality of the Spanish soldiers was such that William was able to negotiate the pacification of Ghent, a treaty in which the provinces bound themselves to expel the Spaniards from the Netherlands. In the troublous times which followed the prince acted with great discretion, and it was by his political prudence that the five northern provinces joined in the Union of Utrecht (1579), and thus laid the foundations of the republic of the United Netherlands. To check this growing power Philip set a price of 25,000 gold crowns upon the head of the prince, with the result that his life was attempted in 1582 at Antwerp, and he was ultimately assassinated at Delft in 1584 by a fanatic named Balthasar Gerard.

William and Mary College, an educational, non-sectarian institution in Williamsburg, Virginia; founded in 1693. Thomas Jefferson and other eminent Virginians were educated here.

Williams, FRANCIS HOWARD, an American dramatic writer, born in Philadelphia, in 1844. Among his plays are: *The Princess Elizabeth, A Lyric Drama, A Reformer in Ruffles, At the Rise of the Curtain*, etc.; also *The Flute Player and Other Poems, The Burden Bearer, An Epic of Lincoln*, etc.— His son, FRANCIS CHURCHILL WILLIAMS, is the author of *The Captain*, a novel, and several other stories and sketches.

Williams, JOHN, missionary, was born near London in 1796, and served as an ironmonger's apprentice. Having been ordained a minister in 1816, he sailed for the South Seas under the auspices of the London Missionary Society; achieved a remarkable success in civilizing the islanders; and after his return to England, in 1834, he published the account of his labors in *A Narrative of Missionary Enterprise in the South Sea Islands* (1837). Returning to Polynesia in 1838 he was murdered by the natives of Erromanga in 1839.

Williams, JOHN SHARP, senator, born at Memphis, Tennessee, in 1854. He engaged in law practice in 1877, was elected to Congress from Mississippi in 1893, and was long the Democratic leader in the House. He was elected to the Senate in 1908 for the term 1911-17.

Williams, SIR MONIER. See *Monier-Williams*.

Williams, ROGER, a Baptist divine and founder of the colony of Rhode Island, North America, was born of Welsh or Cornish parents about 1599; died in 1683. He was sent as a scholar to the Charter-house, afterwards he studied either at Oxford or Cambridge. He is said to have taken orders in the English Church, but because of his religious belief he emigrated in 1631 to New England. When his extreme views regarding the jurisdiction of the civil magistrate caused him to be banished from the colony of Massachusetts he repaired to Rhode Island and founded a settlement, which he called Providence. Here he proclaimed complete religious tolerance, thus making Rhode Island a haven for those persecuted by the Puritans. He was an earnest friend of the Indians. He was twice in England in connection with a charter for the colony, and there made the acquaintance of Milton and other prominent Puritans. He published *A Key into the Language of the Indians of America* (1643); *The Bloudy Tenent of Persecution for the Cause of Conscience* (1644); *The Bloudy Tenent yet More Bloudy* (1652), etc.

Williams, TALCOTT, an American journalist, born of American parents in Turkey, July 20, 1849. From 1881 till 1912 he was on the staff of the *Philadelphia Press*. He then became head of the school of journalism founded by the late Joseph Pulitzer as an adjunct of Columbia University.

Williamsport (wil'yumz-port), a city, the county seat of Lycoming Co., Pennsylvania, on the west branch of the Susquehanna River, 94 miles N. by W. of Harrisburg. It is attractively laid out, with several parks, and a city hall, government buildings, Masonic temple, cathedral, and other notable buildings. It was formerly the greatest lumber market in Eastern United States. The mountains to the north are heavily timbered and there are rich coal mines in the vicinity. There are large lumber mills, steel works, rubber factories, furniture factories, machine shops, tanneries and a large silk mill. This city is the seat of Dickinson Seminary. Pop. 31,860.

Williamstown, a town of Williamstown township (town), Berkshire Co., Massachusetts, on the Hoosac River, 5 miles N. W. of North Adams. It lies in a fertile valley, noted for beautiful scenery, and is a summer resort. The town has bleaching and finishing works and manufactures of

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corduroy and cotton goods. Williams College, founded 1793, is situated here. Pop. 5000.

Williamstown, a seaport in Victoria, on the southwest shore of Hobson Bay, immediately opposite Sandridge (Port Melbourne), and 9 miles by rail from Melbourne. The piers are commodious, and there are shipbuilding yards, patent slips, the Alfred graving dock, and government workshops. There is a lighthouse on the peninsula on which the town is built, and a lightship further down the bay. Pop. 14,083.

Willimantic (wil-i-man'tik), a city of Windham Co., Connecticut, is on the Willimantic River, 16 miles N. W. of Norwich. It contains a State normal training school. The river affords abundant water-power, and the manufactures are extensive, especially of cotton thread, of which it is the greatest producer in the country. There are also large silk, silk-twist, and cotton mills, plumbers' supplies and steam-heating works, etc. Pop. 11,230.

Willis (wil'is), NATHANIEL PARKER, author, born at Portland, Maine, in 1807; died in 1867. He was educated at Boston, Andover and Yale College; employed by S. P. Goodrich (Peter Parley) to edit *The Legendary* (1828) and *The Token* (1829); established the *American Monthly Magazine*, which was merged in the *New York Mirror;* traveled in France, Italy, Greece, European Turkey, Asia Minor and finally England; returned to America in 1837, and afterwards edited *The Home Journal*. His numerous published writings include: *Pencilings by the Way* (1835), *Inklings of Adventure* (1836), *Loiterings of Travel* (1839), *People I Have Met* (1850), *Famous Persons and Places* (1845), *Outdoors at Idlewild* (1854), and *The Convalescent, His Rambles and Adventures* (1859).

Willow (wil'ō), the common name of different species of plants belonging to the genus *Salix*, the type of the natural order Salicaceæ. The species of willows are numerous, about 160 having been described, 35 belonging to the United States. They are either trees or bushes, and grow naturally in a moist soil. On account of the flexible nature of their shoots, and the toughness of their woody fiber, willows have always been used as materials for baskets, hoops, crates, etc. The wood is soft, and is used for wooden shoes, pegs, and the like; it is also much employed in the manufacture of charcoal, and the bark of all the species contains the tanning principle. The Huntingdon or white willow (*Salix alba*) and the Bedford willow (*S. Russelliana*) are large trees, yielding a light soft timber, valuable for resisting the influence of moisture or damp. The weeping willow (*S. Babylonica*) is a native of China, and is a fine ornamental tree. The willow has for long been considered as symbolical of mourning.

Willow-herb. See *Epilobium*.

Willow-moth, a species of mouse-colored moth (*Caradrina cubicularis*), the hinder wings of which are pure white. The larvæ feed on grains of wheat.

Willow-oak, an American tree of the genus *Quercus*, the *Q. Phellos*. The wood is of loose, coarse texture, and is little used.

Willow-wren, *Sylvia trochilus*, one of the most abundant of the warblers, and a summer visitant in Britain, with a pleasing song. The general color is dull, olive-green above, the chin, throat and breast yellowish-white, and the belly pure white.

Wilmerding, a borough in Allegheny Co., Pennsylvania, 13 m. E. S. E. of Pittsburgh. P. 6133.

Wilmersdorf, a town of Prussia, 3 m. S. W. of Berlin. Pop. (1910) 102,716.

Wilmington (wil'ming-tun), a city and port of entry, capital of Newcastle Co., Delaware, is situated on the Delaware River and Brandywine and Christiana Creeks, 27 miles S.W. of Philadelphia. It is the commercial and manufacturing emporium of the State, and has large and flourishing industries, especially in powder-making, vulcanized fiber and glazed kid. There are also large shipyards, iron and steel works, and manufactures of cars, carwheels, bridges, boilers, paper, leather, etc. Among its institutions are a government building, court-house, State insane asylum, normal school and other industrial institutions. Old Swedes' Church built in 1698, marks the site of the oldest Swedish settlement in the Delaware valley. Pop. 87,411.

Wilmington a city, port of entry and capital of New Hanover Co., North Carolina, is situated on the east bank of Cape Fear River about 25 miles from its mouth, and is the largest commercial town in the State. Its notable public buildings include a Federal building, city hall, union station, etc. The river has a depth of 26 feet at mean low water and extensive port facilities including 11 large terminals erected during the past two years.

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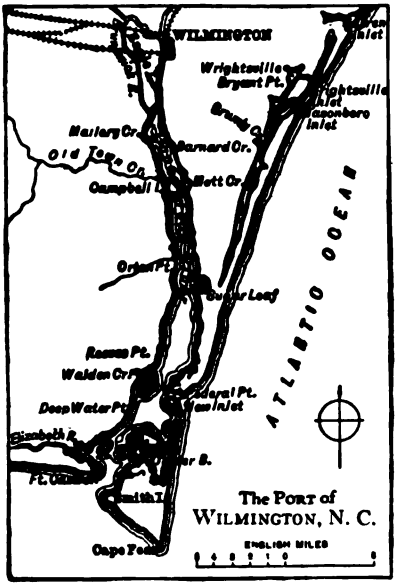
Wilmington has a large export trade in cotton and lumber. It has extensive manufactures, including large lumber



mills, metal works, machine shops, veneer mills, handles and heading factories, turpentine distilleries, etc. Pop. 25,748.

Wilna. See *Vilna.*

Wilmot Proviso. The war between Mexico and the United States terminated in the acquisition of a vast territory by the latter. Mr. Wilmot, of Pennsylvania, in 1846, offered in Congress what became historic as the 'Wilmot Proviso,' that 'No part of the territory thus acquired should be open to the introduction of slavery.' This proviso brought heated discussion of the slave question, and civil war and a dissolution of the Union were threatened in consequence. The proviso failed of passage.

Wilson, a town, capital of Wilson Co., North Carolina, about 44 miles E. by S. of Raleigh. Cotton goods, cottonseed-oil, etc., are manufactured. Pop. 6717.

Wilson (wil'sun), ALEXANDER, an American ornithologist, was born at Paisley, Scotland, in 1766. He emigrated to America in 1794; assisted in editing the American edition of *Rees's Cyclopædia;* also worked at his trade as a weaver and taught a school at Kingsessing, near Philadelphia. Becoming interested in ornithology, he resolved to write and illustrate a work on American birds, and for this purpose traveled on foot through Western New York, then a wilderness, observing its birds. He told the story of his excursion in a lively and graphic work called *The Foresters.* The result of his labor was the *American Ornithology* (seven vols., 1808-13), a work which was completed by Ord, with a continuation by Lucien Bonaparte. It was the pioneer of the magnificent works of Audubon and Charles Bonaparte. He died in 1813, worn out by his great labor on this work.

Wilson, SIR DANIEL, archæologist, was born at Edinburgh in 1816; educated at the university there; became secretary to the Royal Society of Antiquaries; was appointed (1853) professor of history and English literature in University College, Toronto, Canada; and in 1880 was elected president. He wrote numerous works, including *Prehistoric Man, Caliban, the Missing Link, The Lost Atlantis, Anthropology, Left-Handedness,* etc. He died in 1892.

Wilson, HENRY, statesman, was born in Farmington, New Hampshire, in 1812. In 1840, as the 'Natick cobbler,' he addressed political meetings, being elected in that year to the Massachusetts Legislature. In 1855 he was elected United States Senator. His speeches bear the impress of clear-sighted statesmanship. Mr. Wilson was an ardent antislavery man, and was the author of the bill by which slavery was abolished in the District of Columbia (1862). He was reëlected to the Senate in 1865, and was chosen vice-president of the United States in Grant's second term (1862). He died in this office November 22, 1875.

Wilson, HORACE HAYMAN, orientalist, was born at London, in 1786; died in 1860. He was educated for the medical profession, went out to Bengal as assistant-surgeon in the service of the East India Company; was appointed to an office in the Calcutta mint, of which he afterwards became assay-master and secretary; devoted his leisure to the study of Sanskrit; was elected (1832) Boden professor of Sanskrit at Oxford University; and soon afterwards became librarian at the India House and director of the Royal Asiatic Society. His writings included a *Sanskrit-English Dictionary* (1819), and numerous translations of Sanskrit poems, etc.

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Wilson, JAMES, American jurist and signer of the Declaration of Independence, was born in Scotland in 1742; came to America in 1763 and made his home in Philadelphia; delegate to Congress, 1775–77, 1782–83 and 1785–87; was appointed a justice of the Supreme Court in 1789. Died 1798.

Wilson, JAMES, ex-Secretary of Agriculture, was born in Scotland in 1835. He was a member of Congress, 1873–77 and 1883–85. Appointed to the cabinet office by President McKinley, he held that position during the Taft and Roosevelt administrations.

Wilson, JAMES GRANT, author, born in New York city in 1832, served in the Civil War. Besides numerous addresses, essays, and articles in periodicals, he published: *Biographical Sketches of Illinois Officers; Life of General Grant; The Presidents of the United States; Thackeray in the United States*, etc. He was the editor of *Appleton's Cyclopædia of American Biography*, and of *Memorial History of the City of New York*, etc. Died May 2, 1914.

Wilson, JAMES HARRISON, American soldier and author, born in Illinois in 1837. His conduct throughout the Civil War was such as to win for him the title of brevet major-general of volunteers for gallant and meritorious service during the war. In 1865 he commanded a cavalry expedition into Georgia and Alabama during which he captured Jefferson Davis. He entered the regular army at the close of the war with the rank of lieutenant-colonel, retiring from the service in 1870. Served in the Spanish War and in the China expedition of 1900; represented the United States Army at the Coronation of King Edward VII; in 1901 was placed on the retired list as a brigadier-general United States Army. Among other things he wrote: *China: Travels and Investigations in the Middle Kingdom, A Life of General Grant*, etc.

Wilson, JOHN, better known in literature as 'Christopher North,' was born in Paisley, Scotland, in 1785; died in 1854. He was educated at Glasgow University and Magdalen College, Oxford, where he gained the Newdigate prize for an English poem, as also a great reputation for athletics. Leaving Oxford he bought the estate of Elleray, near Windermere, and there formed an acquaintance with Wordsworth, Southey, and Coleridge; contributed to Coleridge's *Friend*, and published a poem called *The Isle of Palms* (1812). Another poem, *The City of the Plague*, appeared in 1816. He now passed the Scots bar, and settled in Edinburgh. He was one of the original contributors to Blackwood's Magazine, established in 1817, and three years afterwards was appointed to the chair of moral philosophy in Edinburgh University, a position which he held until 1851. Besides his numerous magazine articles, the most characteristic of which were some of the *Noctes Ambrosianæ* and those published subsequently as the *Recreations of Christopher North* (1842), he wrote other tales.

Wilson, WOODROW, twenty-eighth president of the United States, educator and author, was born at Staunton, Virginia, December 28, 1856. He was graduated from Princeton in 1879; studied law at the University of Virginia; practiced law in Atlanta (1882–83); received the degree of Ph.D. at Johns Hopkins University (1886); was professor at Bryn Mawr, 1885–88; at Wesleyan, 1888–90; at Princeton, 1890–1910. In 1902 he became president of Princeton University. He wrote *A History of the American People* and others works, and became prominent as a reformer. He was elected governor of New Jersey in 1910. He was chosen on the strength of his irreproachable character and his scientific knowledge of the principles of government, and during his first year in office a number of important reform measures included in his platform were enacted. His successful record as governor brought him the Democratic nomination for President in 1912 and his subsequent election. His term of office was marked by international questions rarely equalled in importance, including the revolutionary outbreaks in Mexico and the great European war, both of these involving the lives and interests of American citizens. President Wilson handled these momentous questions in the cause of peaceful relations, so far as the safety and dignity of the American government permitted. In 1916 he was a second time elected President and began his second term on March 4, 1917. Although a lover of peace and the nominee of a party who had presented him for re-election as 'the man who kept us out of war,' he was forced into the affray to defend the honor of the country and the safety of the lives of Americans on the high seas who were being murdered by Germany's undersea navy. Too, there was the holy cause of invaded Belgium.

President Wilson's notes to Germany and his messages to Congress were acclaimed among all the Allied peoples, who came to look upon him as the leader of the world's thought. His slogan, 'to make the world safe for democracy,' became a powerful rallying cry. On the 3d of

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WOODROW WILSON

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February, 1917, he severed diplomatic relations with Germany and suggested similar action on the part of other nations. The machinations of the agents of Germany in America, as well as other parts of the world, were rapidly bringing that late flourishing empire to scorn and contempt.

President Wilson had settled the difficult Mexican situation, and the withdrawal of American troops from that country was completed by February 5. The torpedoing of American ships continuing, he asked Congress to authorize him to arm merchant ships. The Senate debate on the question was protracted by a few pacifists whom the President styled 'a group of wilful men.' The second session of the 64th Congress ended without passing the bill. President Wilson took matters into his own hands, declared he had full power and went ahead with his program of arming merchant ships. To guard against filibustering in future the Senate, in special session on March 8, passed the famous Cloture rule. See *Cloture*. The great railroad dispute, which threatened a nation-wide strike in March, was settled by President Wilson, who insisted that the demands of the men for a basic eight-hour day must go into effect. Later he took over control of the railroads.

On the assembling of the 65th Congress, summoned by the President in extra session, he called for a declaration of war on Germany and provision for full co-operation with the Allies. The Senate passed the war resolution by a vote of 82 to 6; the House by a vote of 373 to 50. The great peace President became a great war President. He ordered the immediate expansion of the army and navy to full war strength and advocated an Army Draft Bill, which was passed by Congress in May. (See *Conscription*.) Although determined to bring all the resources of the country to bear on the struggle, if need be, he kept in view the possibility of peace and refrained from war with Austria-Hungary in the hope that through that country he might reach the people of Germany and persuade them to overthrow the war lords. But the dual monarchy was plainly under the thumb of the Prussian militarists and on December 3, 1917, President Wilson asked Congress for a declaration of war on Austria-Hungary. As indicating the unanimity of the nation, the House of Representatives passed the war resolution with but one dissenting vote, registered by London, a New York Socialist. The Senate adopted the resolution unanimously.

Through the Russian debacle he endeavored to help in the upbuilding of the new republic, first sending a special diplomatic mission headed by Elihu Root, and later, when the Bolsheviki had taken control, assuring the Soviet of American sympathy in the crucial days of March, 1918.

In one of his speeches he declared, 'The peace we make must deliver Belgium and Northern France from the Prussian conquest and the Prussian menace, but it must also deliver the peoples of Austria-Hungary, the peoples of the Balkans, and the peoples of Turkey alike in Europe and in Asia from the impudent and alien domination of the Prussian military and commercial autocracy.' In his speech of February 11, 1918, President Wilson presented four principles which he said must be accepted by the military and annexationist party of Germany as they had been accepted by all other peoples. 'The tragic circumstance,' he said, 'is that this one party in Germany is apparently willing and able to send millions of men to their death to prevent what all the world now sees to be just.' These are the four principles:

First—That each part of the final settlement must be based upon the essential justice of that particular case and upon such adjustments as are most likely to bring a peace that will be permanent.

Second—That peoples and provinces are not to be bartered about from sovereignty to sovereignty as if they were mere chattels and pawns in a game, even the great game, now forever discredited, of the balance of power; but that,

Third—Every territorial settlement involved in this war must be made in the interest and for the benefit of the populations concerned, and not as a part of any mere adjustment or compromise of claims among rival states; and,

Fourth—That all well-defined national aspirations shall be accorded the utmost satisfaction that can be accorded them without introducing new or perpetuating old elements of discord and antagonism that would be likely in time to break the peace of Europe, and consequently of the world.

Wilts, or WILTSHIRE, a southwestern county of England, bounded by the counties of Gloucester, Somerset, Dorset, Hants, and Berks; area 1350 sq. miles. The north is flat and fertile, the south is Salisbury Plain, an elevated tableland, chiefly uncultivated. The strata of the county are principally cretaceous, belonging to the great central chalk district of England; and the chief rivers are the Kennet and the Upper and Lower Avon. The larger proportion of the surface is in pasture, devoted

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chiefly in the south division to the rearing of sheep, and in the north to cattle-grazing and the dairy, Wiltshire bacon and cheese being famous. The manufactures comprise woolen goods, for which the principal localities are Wilton, Bradford, Trowbridge, Westbury, etc., excellent cutlery and steel goods at Salisbury, ropes and sacking at Marlborough, iron-founding at Devizes, and there is a college of agriculture at Downton. Capital, Salisbury. Pop. (1911) 286,876.

Wimbledon (wim'bl-dun), a town of England, county of Surrey, 7 miles southwest of London, at the northeast extremity of Wimbledon Common. Up to 1889 it was well known in connection with the shooting competitions of the National Rifle Association. There are remains of an ancient British earthwork. Pop. 54,876.

Wimborne Minster (wim'burn), a town in Dorsetshire, England, on the river Allen, near its confluence with the Stour. The principal building is the minster, a fine cruciform structure in various styles. Pop. 3711.

Wincey (win'si), a strong and durable cloth, plain or twilled, composed of a cotton warp and a woolen weft.

Winch, a kind of hoisting machine or windlass, in which an axis is turned by means of a crank-handle, and a rope or chain is thus wound round it so as to raise a weight.

Winchell (winch'el), ALEXANDER, geologist, born at North East, New York, in 1824; died in 1891. He held professorships in the University of Michigan and elsewhere and for a number of years served as State geologist of Michigan. He wrote *Sketches of Creation, Geology of the Stars, Preadamites, World-Life,* and various other works.

Winchendon a town (township) in Worcester Co., Massachusetts. It contains several villages, with manufactures of cottons, toys, woodenware, hardware, leather, etc. Pop. of town, 5678.

Winchester (win'ches-ter), an ancient city of England, in Hampshire, on the Itchen, 12 miles N. E. of Southampton. The most important edifice is the cathedral, which was built in the latter half of the eleventh century, but has since been much added to and altered. It is in the form of a cross; length from east to west, 545 feet, width of the transepts 208 feet. Besides being in itself of great architectural importance, it contains numerous monuments of historical interest; as the tombs of William Rufus, of Edmund, son of King Alfred, and of Izaak Walton; the golden shrine of St. Swithin; bronze figures of James I and Charles I, etc. The other important buildings and institutions are St. Mary's College, founded in 1387, the town hall, the old castle, a corn exchange. In the fourteenth century Winchester was the principal seat of the woolen manufactures in England and had a large foreign trade. Pop. (1911) 40,532.

Winchester, a city, county seat of Clark Co., Kentucky, 18 miles E. of Lexington. It is the seat of Kentucky Wesleyan College. The industries are stock-raising, farming, planing and flour mills, etc. Pop. 9743.

Winchester, a city, county seat of Frederick Co., Va., 32 miles S. W. of Harper's Ferry. It lies in the Valley of Virginia and has several educational institutions, also extensive manufactures of gloves, leather, woolen goods, paper, lumber, flour, etc. National and Confederate cemeteries are located here. During the Civil war in its vicinity were fought several battles, it being repeatedly occupied by both contestants. Pop. 5864.

Winchester, a village and township of Middlesex Co., Massachusetts, 8 miles N. N. W. of Boston. It has a State aviary, a home for aged people, etc., and manufactures of leather, machinery and watch hands. George Bancroft and Theodore Parker were born here. Pop. of town, 9309.

Winckelmann (vink'el-man), JOHANN JOACHIM, critic and historian of ancient classical art, was born at Stendal, Prussia, in 1717. He was educated at Berlin and Halle; became a Roman Catholic, received a pension from the papal nuncio at Dresden (1755), and visited Rome, where he was appointed librarian to Cardinal Alban. In 1768 he was murdered and robbed in an inn at Trieste. His chief work is *Anmerkungen über die Baukunst der Alten* (1762).

Wind, a current in the atmosphere, as coming from a particular point. The principal cause of currents of air is the disturbance of the equilibrium of the atmosphere by the unequal distribution of heat. When one part of the earth's surface is more heated than another, the heat is communicated to the air above that part, in consequence of which the air expands, becomes lighter, and rises up, while colder air rushes in to supply its place, and thus produces wind. It is thus that the sea-breeze is produced every afternoon at places near the coast,

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especially in intertropical countries, the ground having been heated by the sun's rays to a higher temperature than the sea; while about twelve hours later, the reverse effect — a land-breeze — occurs, the ground having fallen at night to a lower temperature than the sea. As the heat of the sun is greatest in the equatorial regions, the general tendency there is for the heavier columns of air to displace the lighter, and for the air at the earth's surface to move from the poles toward the equator. The only supply for the air thus constantly abstracted from the higher latitudes must be produced by a counter-current in the upper regions of the atmosphere, carrying back the air from the equator towards the poles. These are known respectively as the *Trade* and the *Anti-Trade winds*. Besides the unequal distribution of heat already mentioned, there are various other causes which give rise to currents of air in the atmosphere, such as the condensation of the aqueous vapors which are constantly rising from the surfaces of rivers and seas, and the agency of electricity. Winds have been divided into *fixed* or *constant*, as the trade-winds; *periodical*, as the monsoons; and *variable winds*. (See *Trade-winds*, *Monsoon*.) There are also local winds, which receive particular names; as, the *etesian wind*, the *sirocco*, the *simoom*, the *harmattan*, the *mistral*, *typhon*, etc. The velocity and force of the wind vary considerably, as shown by the anemometer. Thus a light wind traveling at the rate of 5 miles an hour exercises a pressure of 2 oz. on the square foot; a light breeze of 10 miles an hour has a pressure of 8 oz.; a good steady breeze of 20 miles, 2 lbs.; a storm of 60 miles, 18 lbs.; a violent hurricane of 100 miles, 50 lbs., a pressure which sweeps everything before it. Whirling winds, known in the United States as tornadoes, are at times of enormous violence, the air movement being at the speed of many hundreds of miles an hour. See Cyclone.

Windber, a borough of Somerset Co., Pennsylvania, 21 miles N. E. of Somerset. It has coal-mining and other industries. Pop. 8013.

Windermere (win'der-mēr), or WINANDERMERE, the largest sheet of water in England, and renowned on account of the beauty of its scenery, is partly in Westmoreland and partly in Lancashire. It is about 11 miles long, and averages 1 mile in breadth; its principal feeders are the Brathay and the Rothay, and it has numerous islets.

Windgalls (wind'gâlz), are puffy swellings about the fetlock joints of animals, especially the horse, a result of over-work on hard roads. They are not accompanied with pain or lameness and cause no serious trouble. A long rest may cure them in young horses.

Windham (wind'am), WILLIAM, an English statesman, born in London in 1750; died in 1810. After being educated at Eton, Glasgow, and Oxford, he was returned to parliament (1784) as member for Norwich. Opposed at first to Pitt's administration he joined in Burke's condemnation of the French Revolution, and advocated the war against France; became secretary of war in 1794, and remained in this position until the retirement of Pitt in 1801; took office again in the Grenville administration (1806), and brought forward a bill to limit the term of service in the army, as also to increase the pay and pensions of officers and men; retired from office (1807), and strenuously opposed the Copenhagen and Walcheren expeditions. He was the friend of Dr. Johnson and Cobbett, and combined the varied qualities of scholar, orator, statesman, athlete, and sportsman.

Wind-instrument, an instrument of music, played by means of artificially-produced currents of wind, as the organ, harmonium, etc., or by the human breath, as the flute, horn, etc. See *Instrument* and *Instrumental Music*.

Windlass (wind'las), a modification of the wheel and axle used for raising weights. The simple form of the windlass used in ships, for raising the anchors, consists of a strong beam of wood placed horizontally, and supported at its ends by iron spindles, which turn in collars or bushes inserted in what are

Ship's Windlass.

termed the *windlass bitts*. This large axle is pierced with holes directed toward its center, in which long levers or handspikes are inserted for turning it round when the anchor is to be weighed or any purchase is required. It is furnished with *pawls* to prevent it from

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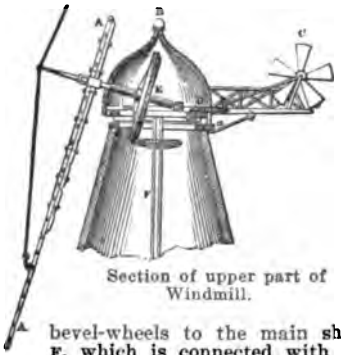
turning backwards when the pressure on the handspikes is intermitted.

Windmill, a mill which receives its motion from the impact of wind upon sails, and which is used for grinding corn, pumping water, etc. In structure the windmill is a conical or pyramidal tower, and from the position of the sails in relation to the wind-shaft it is described as either *vertical* or *horizontal*. In the former, a section of which is here given, the wind is made to act upon sails or vanes A A attached by means of rectangular frames to the axle or *windshaft* of the mill. This axle is placed nearly horizontal, so that the sails by the pressure of the wind revolve in a nearly vertical plane, thus giving a rotary motion to the driving wheel E fixed in the wind-shaft. The movement thus produced is transferred by means of

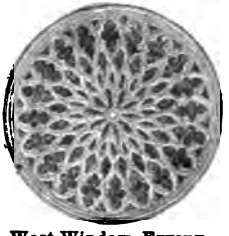


Section of upper part of Windmill.

bevel-wheels to the main shaft F, which is connected with the specific machinery of the mill. As the sails to be effective must always face the wind, this is accomplished in modern mills by a self-adjusting cap B, moved by a fan or flyer C attached to the projecting framework at the back of the cap. By means of a pinion on its axis, motion is given to the inclined shaft and to the wheel D on the vertical spindle of the pinion *a*; this latter pinion engages the cogs on the outside of the fixed rim of the cap, and by these means the sails are kept constantly to the wind, when the wind causes the fan C to revolve. In the *horizontal* windmill, which is considered inferior to the other, the wind-shaft is vertical, so that the sails revolve on a horizontal plane. In most of the windmills used in America, the sails consist of narrow boards arranged in a circular framework at a constant angle to catch the wind. Windmills, while widely replaced by the steam engine, are still largely used in the United States and Holland.

Windom, WILLIAM, statesman, born in Belmont Co., Ohio, in 1827; died in 1891. He was elected to Congress from Minnesota in 1858 and to the senate in 1870; was Secretary of the Navy under Garfield, in 1881, and Secretary of the Treasury under Harrison, in 1889.

Window (win'dō), an opening in the wall of a building to admit light and air into the interior. In dwelling houses in ancient times the windows were narrow slits, and it was not until about the end of the twelfth century that glass was used to any great extent in private houses in England. Windows, properly so called, were almost unknown in the religious edifices of the Egyptians, Greeks, and Romans, the light being admitted at the roof, but they constitute an essential and distinguishing feature of the Gothic style. In modern houses windows are made capable of being opened and shut by means of casements or sashes. In Britain a window tax was imposed in 1695, and in 1851, when the tax was abolished, each house having more than seven windows was taxed. No such tax was ever imposed in the United States.



West Window, Evreux Cathedral.

Windpipe. See *Trachea*.

Windsor (win'zur), or NEW WINDSOR, a municipal and parliamentary borough in England, county of Berks, beautifully situated on the Thames, 22 miles W. from London, and connected by a bridge with Eton. There are several churches and chapels, barracks, an infirmary, etc. The only manufacture of importance is that of tapestry. Pop. 19,840. Windsor owes its chief importance to its castle, which stands east of the town on a height overlooking the river Thames, and is the principal royal residence in the kingdom. It was begun, or at least enlarged, by Henry I, and has been altered and added to by almost every sovereign since. The castle stands in the Home Park or 'Little Park,' which is 4 miles in circumference, and this again is connected with the Great Park, which is 18 miles in circuit, and contains an avenue of trees 3 miles in length. The chief features of interest in the castle are the

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old state apartments; St. George's Chapel, where the Knights of the Garter are installed, and the vaults of which contain the remains of Henry VI, Edward IV, Henry VIII, Charles I, George III, George IV, and William IV; the Round Tower or ancient keep; and the present state apartments occupied by the sovereign.

Windsor, a town and port of entry, capital of Hants Co., Nova Scotia, on an arm of Minas Bay, 45 miles N. W. of Halifax. It is the seat of King's College, founded in 1788. There are here extensive mines of limestone, gypsum and other useful minerals. Windsor was settled about 1745 and incorporated in 1878. Pop. 3398.

Windsor, a city in Ontario, Canada, on the Detroit River and Grand Trunk, Canadian Pacific, and other railways. It is in a fruit region, and has salt, chemical, and other important industries. Pop. 20,000.

Windward Islands (wind'ward), one of the divisions of the Lesser Antilles in the West Indies, so called in opposition to another division of the same, called the *Leeward Islands*. The term is vaguely used, but generally includes Martinique, St. Lucia, St. Vincent, Grenada, Barbados, and Tobago.

Wine (wīn), the term specifically applied to the fermented juice of the grape or fruit of the vine, though it may also be applied to the fermented juice of any fruit. (See *Vine.*) Wines are distinguished practically by their color, hardness or softness on the palate, their flavor, and their being still or effervescing. The differences in the quality of wines depend partly upon differences in the vines, but more on the differences of the soils in which they are planted, in the exposure of the vineyards, in the treatment of the grapes, and the mode of manufacturing the wines. When the grapes are fully ripe, they generally yield the most perfect wine as to strength and flavor. The juice is expressed from the grapes by means of presses of all varieties of construction, from the simple lever and wedge press to the machine with hydraulic power. It is usual to separate the juice as it is expressed into first, second, and third 'runs,' the first pressing being the best quality, and the amount of all the juice is usually about 70 per cent. of the weight of the grapes. The juice of the grape when newly expressed, and before it has begun to ferment, is of a sweet taste, and is called *must*. The fermenting process requires much time and attention, and if it be arrested while part of the sugar is unchanged a *fruity* wine is the result. If the process, however, is completed, and all the sugar converted into alcohol, a *dry* wine is obtained. When an *effervescing* wine, like champagne, is desired the fermenting liquid is bottled, and the process of fermentation completed in the bottle, where the carbonic acid gas remains to give it a sparkling effervescent quality. When the wine is *red* in color it shows that the skins of the grape have remained in the vat during fermentation, while in *white* wines the skins have been removed before that process is begun. The leading character of wine must be referred to the alcohol which it contains, and upon which its intoxicating powers principally depend. The amount of alcohol in the stronger ports and sherries is from 16 to 25 per cent.; in hock, claret, and other light wines from 7 to 12 per cent. Wine containing more than 13 per cent. of alcohol may be assumed to be fortified with brandy or other spirit. The most celebrated ancient wines were those of Lesbos and Chios among the Greeks, and the Falernian and Cecuban among the Romans. The principal modern wines are Port, Sherry, Claret, Champagne, Madeira, Hock, Marsala, etc. The varieties of wine produced are almost endless and differ in every constituent according to the locality, season, and age. The principal wine-producing countries are France, Germany, Spain, Portugal, Italy, Sicily, Greece, Cape Colony, Australia, and the United States. Much the greater quantity of wine consumed in the United States is the product of that country, chiefly of California.

Wine-measure, an old English measure by which wines and other spirits were sold. In this measure the gallon contained 231 cubic inches.

Winfield (win'fēld), a city, county seat of Cowley Co., Kansas, 50 miles S. S. E. of Wichita. Here are an institution for the feeble-minded, two colleges, a Chautauqua Assembly, flour mills, produce plants, etc. Pop. 6700.

Winged Bull, an architectural decoration of frequent occurrence in ancient Assyrian temples, where winged human-headed bulls and lions of colossal size usually guarded the portals. They were evidently typical of the union of the greatest intellectual and physical powers.

Winged Lion, the symbol of the evangelist St. Mark, which was adopted as the heraldic device of the Venetian Republic. A celebrated bronze figure of the winged lion

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of St. Mark surmounting a magnificent red granite column, formed out of a single block, stands in the piazzetta of St. Mark at Venice.

Wing-shell. See *Pinna*.

Winnipeg (win'i-peg), a lake of Canada, province of Manitoba; length, about 250 miles; breadth, from 5 to 70 miles. It receives the surplus waters of lakes Winnipegoos and Manitoba, besides the river Winnipeg, but its chief tributaries are the Saskatchewan and the Red River. Its surplus water is discharged by the Nelson River into Hudson Bay. The river of the same name, which flows into Lake Winnipeg, rises in the Lake of the Woods, and has a length of about 250 miles. Its navigation is interrupted by falls.

Winnipeg, capital of the province of Manitoba, Canada, stands at the confluence of the Assiniboine and the Red rivers, 40 miles S. of Lake Winnipeg. It occupies a central position on the Canadian Pacific Railway, 1424 miles by rail W. N. W. of Montreal, and 512 miles N. N. W. of Minneapolis. The locality of the city is that of the old Red River colony of Lord Selkirk, founded in 1812. In fact, five fur traders' forts have stood within the city limits: Fort Rouge, a French outpost (1736); Fort Gibraltar, built by Montreal traders (1804-15); Fort Douglas, the Lord Selkirk stronghold (1813-15); Old Fort Garry, of the Hudson Bay Company (1821-35), and New Fort Garry (1835-82). The transfer of Rupert's Land to Canada in 1870 led to the founding of the Manitoba province, and at that date Winnipeg began as a village, half a mile north of Fort Garry. It owes its sudden expansion into an important city largely to its position on the Canadian Pacific, while it is also benefited by railway connection with the United States and by several other railways which radiate from it. The site of the city is on a prairie, part of it being originally swampy, though it is now well drained. It extends on both sides of the Assiniboine, and on the west side of the Red River, the east side of which is occupied by its suburb of St. Boniface, settled in 1817 by Lord Selkirk's German De Meuron soldiers. The growth of Winnipeg has been remarkably rapid. In 1871, the population of the village was only 241, but it grew so rapidly that in 1873 it was incorporated as a city, in the face of vigorous opposition by the Hudson Bay Company. Canadian immigration now became rapid, and in 1881 it had 7985 inhabitants. Its central position on the Canadian Pacific now gave it a great boom, wild land speculation setting in, and the population doubling in a few months. This 'boom', however, checked the development of the city, a business collapse following, which caused much loss and rapidly diminished the population. But prosperity soon returned and in 1886 it had 20,238 population. Being on the eastern edge of the prairie region, which extends for a thousand miles to the Rocky Mountains, and lying westward of the great Laurentian formation extending to Montreal, it is admirably situated as an important railway center. The first railway to reach it was the Pembina branch of the Canadian Pacific, in 1878. This branch connects with the railway system of the United States. The Canadian Pacific main line soon after traversed the city and several branches radiated from this center. These advantages and its location on navigable rivers made it the commercial focus of the vast agricultural territory of the Canadian Northwest, a fact to which it is largely owing its rapid development. In 1891 it had a population of 25,642, and in 1901 of 42,340, but since the latter date, the settlement of the wheat-growing territory of the Northwest has given it a phenomenal growth, its population reading 136,035 in 1911. The city is handsomely laid out, with numerous interesting edifices, including the city hall, the parliament buildings, the grain exchange, governor's residence, court-house, University of Manitoba (a well endowed institution with four affiliated colleges), St. John's Episcopal College, Manitoba Medical College and St. Boniface (Roman Catholic) College. Among the business interests of the city, the vast bazaar known as the Hudson Bay Company's stores stands preëminent. There are also great flour mills and grain elevators, the repair shops of the Canadian Pacific Railway, and manufactures of agricultural implements, cottons, sewing silk and dairy implements.

Winona (wi-nō'nȧ), a city county seat of Winona Co., Minnesota, situated on the west bank of the Mississippi. It is one of the largest grain-shipping points in the United States, and an active manufacturing city, producing agricultural implements, carriages and wagons, flour, patent medicines, malt liquors, etc. Here is a State normal school and other educational institutions. Pop. 22,000.

Winsey, or WINCEY, a cloth consisting of woolen warp and cotton weft, or of wool mixed with a portion of cotton. Heavy winseys are used

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for skirtings, light winseys for men's shirts.

Winslow (win'zlō), EDWARD, governor of Plymouth colony, Massachusetts, was born in 1595 at Droitwich, England, sailed in the Mayflower, was governor or assistant governor after 1624, and returned on three occasions to England to further the interests of the colony. In doing this he published *Good News From New England* (1624), *Hyprocrisie Unmasked* (1646), and *New England's Salamander* (1647), all these being valuable descriptions of the young colony. He was appointed by Cromwell chief commissioner of an expedition against the West Indies and died at sea in 1655.—JOSIAH, his son, born in 1629; died in 1680; was assistant governor from 1657 to 1673, and afterwards governor until his death. He was appointed general-in-chief of the United Colonies in 1675, and in the same year the first public school was founded under his auspices. —JOHN, Josiah's grandson, born in 1702; died in 1774; carried out, under orders from the British authorities, the removal of the Acadians.

Winslow, FORBES BENIGNUS, physician, born at London in 1810; died in 1874. He was educated in Scotland and Manchester; studied medicine at New York and London Universities passed the College of Surgeons in 1835; and in 1849 was graduated M.D. from Aberdeen. He devoted himself chiefly to the investigation of mental disease, and published *Anatomy of Suicide* (1840), *Insanity in Criminal Cases* (1843), *Obscure Diseases of the Brain* (1860), etc.

Winslow, JOHN, naval officer, born at Wilmington, North Carolina, in 1811; died in 1873. He entered the navy about 1827, and in 1862 served under Captain Foote on the Mississippi River. In 1863 was put in command of the *Kearsage*, a 7-gun steamer, and sent to the coast of Europe to watch the Confederate cruisers. Here on June 19, 1864, he met the privateer *Alabama*, and sunk it after a short fight, its crew being rescued. He was appointed commodore in 1865 and rear-admiral in 1870.

Winsor, JUSTIN, historian, born at Boston, Massachusetts, in 1831; died in 1897. He was superintendent of the Boston Public Library, and librarian of Harvard University. He was the highest authority on the early history of North America. His works are *Memorial History of Boston*, and *The Narrative and Critical History of America*.

Winsted (win'sted), a borough and one of the capitals of Litchfield Co., Connecticut, at the outlet of Long Lake, 28 miles N. W. of Hertford. It has a county hospital, children's home, and varied manufactures. Pop. 7754.

Winston, JOHN CLARK, publisher, political reformer, was born at Darlington, Indiana, in 1856. He was graduated at Haverford College in 1881; entered the publishing business in Philadelphia, and in 1884 organized and became president of The John C. Winston Company. He has long been prominent in reform politics in Philadelphia.

Winston-Salem, a city, county seat of Forsyth County, North Carolina. Winston and Salem were formerly separate, but were consolidated into one city in 1913. Salem was established in 1766; Winston in 1849. The city is located within fifty miles of the main range of the Blue Ridge Mountains and is an important railroad and industrial center, with varied manufactures. It is the principal trading center of a wide area. Pop. 30,000.

Wint, PETER DE, painter, was born at Stone, Staffordshire, England, in 1784; died in 1849. He descended from a Dutch family settled in New York, studied Mezzotint engraving, but soon took up oil and water-color painting. He became notable for his beautiful water-color illustrations of English landscape, architecture and country life. His favorite fields of work were in Lincoln, Yorkshire and Derbyshire, though he also painted scenes on the Thames and the Trent, in Wales and elsewhere. He exhibited mainly in the rooms of the Water-color Society. He is well represented both in the National Gallery and at South Kensington. Among his celebrated pictures are *The Cricketers*, *Lincoln Cathedral*, *The Hay Harvest*, *Richmond Hill*, *Cows in Winter*, *A Cornfield* and *A Woody Landscape*, the last two oil paintings.

Winter (win'ter), the coldest season of the year, in the northern hemisphere comprising the months of December, January and February. The astronomical winter begins on the shortest day (December 22) and ends with the vernal equinox (March 21).

Winter, JOHN STRANGO. See *Stannard, Mrs. Arthur*.

Winter, WILLIAM, author and dramatic critic, was born at Gloucester, Massachusetts, in 1836. He studied law, but soon forsook it for a career in literature, which he had begun in early life. In 1854 appeared his first dramatic criticism, a field in which he

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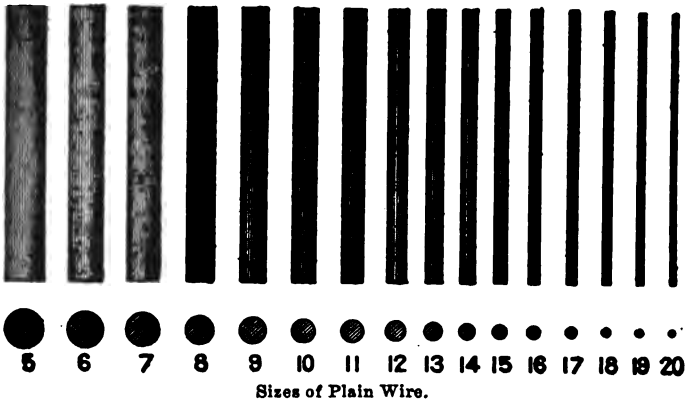
has since continued, gaining high reputation as a critic. He has written much under his own and other names, largely in poetry and on stage subjects, and has edited many of Shakespeare's and other plays, also the *Poems of George Arnold*, the *Poems and Stories of John Brougham*, etc. He died June 30, 1917.

Winter-cress, the common name of two cruciferous plants of the genus *Barbarea*. *Barbarea vulgaris*, called also *yellow rocket*, grows on the banks of ditches and rivers, and about hedges and walls. It is bitter and sharp to the taste, and is sometimes used as a salad.

Wintergreen, a name of several plants, one of them being the partridge-berry (which see). The name is also given to a genus of perennial plants (*Pyrola*), order Pyrolaceæ, having short stems, broad evergreen leaves, and usually racemose white or pink flowers. *P. rotundifolia* possesses astringent properties and was formerly used in medicine.



Sizes of Plain Wire.

Winter-moth, a moth (*Cheimonobia brumata*), the larvæ of which are exceedingly injurious to apple, pear, cherry, and plum trees. The moths appear in their perfect state in the beginning of winter.

Winter's-bark (*Drimys Winteri*), a plant of the nat. order Magnoliaceæ, a native of South America. It is an evergreen shrub, the bark of which has an agreeable, pungent, aromatic taste, and tonic properties.

Winter Solstice. See *Solstice*.

Winterthur (vin'tĕr-tör), a busy town of Switzerland, canton of Zürich, on the Eulach, 12 miles northeast of Zürich. The principal industries are cotton spinning, silk weaving, iron foundries, machine making, etc. Pop. 22,335.

Winthrop, a town (township) of Suffolk Co., Massachusetts, 5 miles N. E. of Boston. It forms a peninsula in Massachusetts Bay, and is a favorite summer resort. Pop. 10,132.

Winton, a borough of Lackawanna Co., Pennsylvania, 18 miles N. E. of Scranton. It is in a coal-mining district. Pop. 5280.

Wire, any metallic substance drawn to an even thread or slender rod of uniform diameter by being passed between grooved rollers or drawn through holes in a plate of steel, etc. Wire is usually cylindrical, but it is also made of various other forms. The metals most commonly drawn into wire are gold, silver, copper, aluminum, iron and steel; but the finest wire is made from platinum. Copper and iron wire is extensively used for telegraph and telephone. For fences great quantities of plain and barbed wire are produced. During the European war barbed wire was extensively employed as a protection against infantry attack by the enemy. *Wiredrawing* is the name for the process of making wire. An important use of wire in engineering is for the manufacture of *wire rope*. This is composed of strands of metal wire twisted together. These wire ropes have displaced fiberropes in many branches of industry. They are employed for suspension bridges, for hoisting machines, telegraph cables, ship's hawsers, etc. Endless wire ropes or cables are employed on traction railways in some instances.

Wire-glass, window glass in which a screen of woven wire

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is imbedded. The molten glass is poured on an iron platform and the netted wire, heated red hot, is pressed into it. The result is an unbreakable sheet of glass.

Wireless Telegraphy, the sending of telegraphic messages through open space, without the use of conducting wires. Three different methods have been made use of in wireless telegraphy, which may be classed as conduction, induction and wave methods. In the first method currents are sent through the earth from an electrode to another at the sending station. In induction, use is made of the property which alternating currents possess of exciting similar currents in neighboring conductors, the aim being to get as intense a current as possible in the secondary circuit. Mr. W. H. Preece, England, by combining the two, signaled in this way as far as 40 miles. The third and the only method which has proved practically available is by the use of electro-magnetic waves. Guglielmo Marconi, an Italian, after long experiment, patented in 1897 a method entirely independent of wires, the electric waves being sent, presumably, through the ether, by the aid of a transmitting apparatus, and being detected by a *coherer*, a glass tube filled with metallic filings, into the end of which the terminals of a relay circuit enter. The wave falls on conducting material and, the spark gap being replaced by a coherer, the metallic filings magnetically cling together, closing the relay circuit, so that a signal is made. On breaking the current, a slight tap on the coherer or other means breaks the cohesion of the filings and the relay circuit is broken. In this way a rapid succession of signals can be sent. In 1899 Marconi conducted in England an exhaustive series of successful experiments, sending messages across the English Channel from the South Foreland to the French coast near Boulogne, and extending his results until much longer distances were covered. The process of development was continued until, to the world's astonishment, signals were sent across the Atlantic and, finally, commercial messages were transmitted over this distance.

Marconi's system is based on the property supposed to be exerted by the vibrations or waves of electric currents passing through a wire of setting up similar vibrations in the ether of space. These waves extend in every direction from the point of departure and by ingenious and very delicate receiving instruments. their presence in space is indicated and they are taken up in sufficient strength to repeat their pulsations and in this way reproduce the signals sent from the transmitter. One difficulty hitherto has been that a message may be received by hundreds of receiving instruments in all directions, thus preventing secrecy. Many efforts have been made to overcome this defect, but as yet with only partial success. The distance to which messages can be sent has so far depended largely on the height to which the wires extend above the earth's surface, lofty poles being erected at the stations. The height of these has been gradually increased until the Eiffel Tower at Paris has been utilized as a sending station. The strength of the electric waves has been similarly increased to add to their space-penetrating capacity. The record of wireless telegraphy has been in this way improved until now it has come into daily competition with other means of news sending. Methods of tuning the instruments have been adopted which limit the influence of the currents to properly tuned receivers and in this way some degree of secrecy is attained. Though the honor of inventing the art of wireless telegraphy is generally ascribed to Marconi, this is to give him more credit than he deserves. The principles involved were discovered by others and the utmost done by him was to invent a practical method of applying them. There are other systems of wireless telegraphy of later invention than that of Marconi, through a different application of the same principles, but none so far that seems likely to supplant the Marconi process. Messages have been sent to enormous distances, far surpassing the width of the Atlantic, as from Nova Scotia and Ireland to Argentina, a distance of 5600 miles. Under exceptional conditions a distance of 6500 miles was at length attained, and communication between Japan and the United States was established in 1915. For overland messages the limit of distance is less than oversea. Trans-Atlantic passenger vessels are now fitted out with wireless apparatus, by means of which almost constant communication can be kept up between passing vessels and between ships and shore. The efficiency of the wireless process as a very useful appliance on shipboard has been frequently demonstrated by indicating the locality of sinking ships and calling others to their aid. Relief has been brought in this way to vessels in distress and many lives saved. An important example is that of the sinking of the Titanic in 1912. By means of wireless

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messages from ship to ship the width of the Pacific has been practically covered, as ships enroute from America to Australia or Asia can be kept in touch with Honolulu through almost the entire journey. Law in the United States now requires that all ocean passage-steamers carrying 50 or more passengers on routes of 200 miles or over, must be equipped with efficient wireless apparatus and operators. The distance reached must be at least 100 miles. The Canadian law provides that every sea-going and coasting passenger ship of over 400 tons gross, registered in Canada, and every sea-going and coasting freight ship of over 1200 tons gross, shall be equipped with a wireless apparatus. Wireless messages have been successfully sent from aeroplanes, balloons and submarine vessels, and the naval vessels of all nations are kept in easy communication by this method. Wireless press messages between America and Europe are also matters of daily performances. Great Britain proposes to send wireless messages *e* ound the world by a system of relays.

Wireless Telephony. The system of electrical transmission employed in wireless telegraphy has recently been applied successfully in telephony, through the invention of suitable apparatus, and it is possible to telephone many miles without wires. Distances reached in this manner have rapidly and remarkably increased, and in September, 1915, a message sent from Arlington, Va., to California was distinctly heard in Hawaii.

Wire-worms, the name given the grubs of the click beetle (*Elater* or *Agriotes*). They are perhaps the most injurious of farm pests, destroying root, grain and fodder crops. Their name is given from their likeness in shape and toughness to a piece of wire. They are of yellowish color, ¼ to ½ inch in length, with three pairs of legs and a suctorial appendage below the tail. Among the natural enemies of these worms, moles, plovers, pheasants and rooks are the most important.

Wirt, WILLIAM, lawyer, born at Bladensburg, Maryland, in 1772; was admitted to the bar in 1792, and in 1806 settled in Richmond, Va., where he became a prominent lawyer. He distinguished himself at the trial of Aaron Burr, in 1807, as one of the counsel for the prosecution. He held many State offices, was appointed United States District Attorney in 1816, and Attorney-General in 1817, holding the latter office till 1829, through three administrations. He was nominated for President in 1832 by the Anti-Masonic party and received the electorial vote of Vermont. He died February 28, 1834.

Wisbech, OR WISBEACH (wis'bēch), a town of Cambridgeshire, England, on the Nene, on the island of Ely, 40 miles N. of Cambridge. Vessels of nearly 500 tons can ascend to Nene, and the place has some trade and manufactures. It was long famous for its woad and this is still made here for dyeing. A castle was founded here by William the Conqueror in 1071, was several times rebuilt, but was demolished in 1816. Pop. (1911) 10,828.

Wisby (vis'bē), a seaport famous in medieval times on the Swedish island of Gothland, 130 miles S. of Stockholm. It was one of the most important commercial cities in Europe during the tenth and eleventh centuries and a principal factor of the Hanseatic League in the fourteenth and fifteenth. It was captured and plundered by Valdimar III of Denmark, in 1361, and this proved fatal to its prosperity. Its remains attest its early grandeur. Pop. 6666.

Wisconsin (wis-kon'sin), a river which rises on the northern border of Wisconsin, runs southward, becomes navigable at Portage city, and enters the Mississippi 4 miles below Prairie-du-Chien after a course of nearly 600 miles. It is remarkable for its rapids and falls.

Wisconsin, one of the northern United States, bounded north by Lake Superior, northeast by Michigan, east by Lake Michigan, south by Illinois, and west by Iowa and Minnesota, the Mississippi river separating it from the latter States; area, 56,066 sq. miles. It consists of an undulating plateau, varying from 600 to 1500 feet above the sea-level, with high bluffs along the rivers and lakes, elsewhere diversified with prairie and woodland. Besides Michigan and Superior there are numerous small lakes; the chief rivers, which drain into the Mississippi, are the St. Croix, Chippewa and Wisconsin. In winter the weather is severe, but on the whole the climate is dry and healthy. The northern part of the State is heavily timbered, but is fast becoming settled. The State ranks high in agricultural value, the soil outside the wooded country being good and producing large crop, such as wheat, corn, rye, oats, barley, potatoes, hay and beet sugar. Fruit growing is an important industry, and cheese and butter making have very greatly increased. So has tobacco-growing, which is profitable, the leaf commanding a high price for wrappers.

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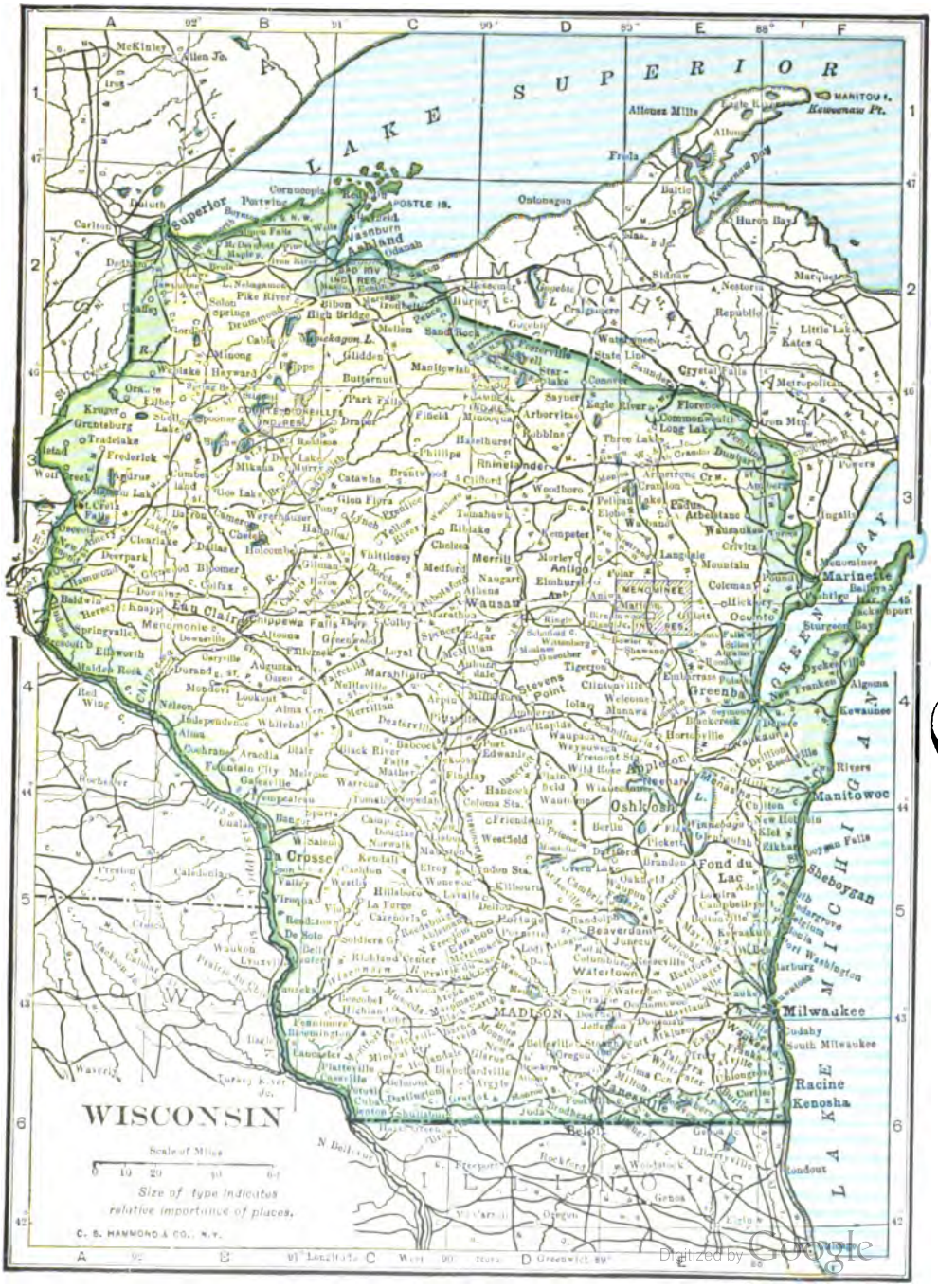

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In the north the lumber business is large. Horses are kept in large numbers and sheep are numerous, the wool clip being valuable. The mineral wealth is great, especially of iron ore, of which the yield is enormous. An excellent hydraulic cement comes from the vicinity of Milwaukee. Galena, limestone, lead and zinc are mined. The lakes and streams abound with fish, especially trout and black bass. The manufactures in the cities are chiefly furniture, agricultural implements, carriages, saddlery, woolen goods, leather, brooms, nails, paper, steel rails, etc. At Milwaukee are some of the largest beer brewing corporations in the world. There are a number of universities and colleges, the Wisconsin University, Madison, being liberally subsidized by the State. Wisconsin was admitted to the Union in 1848. The inhabitants to a large extent are German in origin. Milwaukee is the chief town, and Madison the capital. Pop. (1910) 2,333,860.

Wisconsin, UNIVERSITY OF, a State co-educational institution, located at Madison, Wisconsin, widely known throughout the country because of its active extension work in all parts of the State. The University comprises a College of Letters and Science, Graduate, Engineering, Law, Agriculture, Medicine and Library Schools; and a flourishing Summer School is maintained. The extension division consists of the department of correspondence study, instruction by lectures, debating and public discussion, and general information and welfare work. For the purposes of this extension study the State is divided into fourteen districts, with university headquarters in each. The College of Agriculture maintains an experiment station, long and short courses in agriculture, farmers' institutes, and courses in home economics. The campus of the University at Madison covers 926 acres on Lake Mendota and contain some 26 buildings. The students in 1912 numbered 5748.

Wisdom (wiz'dum), BOOK OF, called by the Septuagint the *Wisdom of Solomon*, one of the apocryphal books of the Old Testament.

Wise (wīz), HENRY A., statesman, was born on the eastern shore of Virginia in 1808, and died in 1876. He was sent as Minister to Brazil in 1844, and was elected Governor of Virginia in 1855, after a most energetic campaign.

Wishart (wish'ärt), GEORGE, one of the first martyrs to the Protestant religion in Scotland, was born in Kincardineshire early in the sixteenth century; traveled in Europe where he accepted the Reformed doctrines; returned to Scotland and began to teach, but was prosecuted for heresy; fled to England in 1538, and remained in Cambridge for six years; returned to Scotland in 1543, and preached in the chief towns, for which offense, at the order of Cardinal Beaton, he was arrested in the house of Cockburn of Ormiston, tried by a clerical assembly in St. Andrews, and burned at the stake there in 1546.

Wishaw (wish'ą), a police burgh, Scotland, Lanarkshire, 15 miles S. E. of Glasgow. It has several large coal-mines, iron, steel, and nail works, fireclay brick-works, railway-wagon works, and a distillery. Pop. 20,873.

Wismar (vēs'mär), a seaport town in Mecklenburg-Schwerin, North Germany, situated at the head of a bay in the Baltic, 18 miles N. E. of Schwerin. It has some manufactures, an excellent harbor, and a considerable trade in coal, timber, iron, etc. Pop. (1905) 21,902.

Wissembourg. See *Weissenburg*.

Wistaria (wis-tā'ri-a), a genus of plants, nat. order Leguminosæ. The species are deciduous, twining, and climbing shrubs, natives of Japan, China and North America. When in flower, they form some of the handsomest ornaments of the garden. *W. frutescens* is a species belonging to the United States.

Wister, ANNIS LEE (Furness), born at Philadelphia in 1830, married Dr. Caspar Wister. She translated into English numerous novels from the German of E. Marlitt and others, which became very popular. She died in 1908.

Wister, OWEN, novelist, born at Philadelphia in 1860. He was graduated from Harvard, became a lawyer, and gained wide repute by *The Virginian*, a novel of cowboy life. *Lady Baltimore* gained equal popularity. He has written various other stories and sketches.

Witchcraft (wich'kraft), a supernatural power which persons were formerly supposed to obtain by entering into compact with the devil, who engaged that they should want for nothing, and be able to assume whatever shape they pleased, to visit and torment their enemies, and accomplish their infernal purposes. As soon as the bargain was concluded the devil was said to deliver to the witch an imp or familiar spirit, to be ready at call, and to do whatever it was directed. By the aid of this imp and the devil together the

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witch, who was almost always an old woman, was enabled to transport herself through the air on a broomstick, and to transform herself into various shapes, particularly those of cats and hares; to inflict diseases on whomsoever she pleased, and to punish her enemies in a variety of ways. The belief in witchcraft is very ancient. It was a common belief in Europe till the sixteenth century, and maintained its ground with tolerable firmness till the middle of the seventeenth century. Indeed it is not altogether extinct even at the present day. Numbers of reputed witches were condemned to be burned, so that in England alone it is computed that no fewer than 30,000 of them suffered at the stake. The last victim was executed in 1722 in Scotland, and in the United Kingdom prosecution for witchcraft was abolished in 1736 by act of parliament. In the United States a few executions for witchcraft took place in the early colonial period, the Salem witchcraft delusion becoming historical. In France executions for witchcraft were prohibited by an edict of Louis XIV as early as 1670.

Witch-hazel. See *Wych-hazel.*

Witenagemot (wit'e-na-ge-mot'; literally, 'meeting of the wise men'), among the Anglo-Saxons, the great national council or parliament, consisting of athelings or princes, nobles or ealdormen, the large landholders, the principal ecclesiastics, etc. The meetings of this council were frequent; they formed the highest court of judicature in the kingdom; they were summoned by the king in any political emergency; their concurrence was necessary to give validity to laws, and treaties with foreign states were submitted to their approval. They had even power to elect the king. See *Anglo-Saxons.*

Wither (with'er), GEORGE, an English poet, was born in Hampshire in 1588; died in 1667. He was educated at Magdalen College, Oxford; afterwards entered himself a student of Lincoln's Inn; and in 1613 published his satires entitled *Abuses Stript and Whipt*, the severity of which led to his confinement in the Marshalsea. Having been released he took an active part on the side of the Parliament when the Civil war broke out, and sold an estate to raise a troop of horse. Under the Long Parliament he enjoyed various lucrative employments.

Witherspoon (with'er-spön), JOHN, signer of the Declaration of Independence, was born in Gifford, Scotland, in 1722. In 1768 he became president of Princeton College. He identified himself with the cause of the colonists and was elected to the Continental Congress. His patriotic work was arduous and of supreme importance. He died in 1794.

Witness (wit'nes), in law, (*a*) one who signs his name as evidence of the genuineness of another signature; (*b*) a person who gives testimony or evidence under oath or affirmation in a judicial proceeding. See *Evidence.*

Witt, DE. See *De Witt.*

Witte, SERGEI YULIEVITCH, a Russian statesman, was born in 1840 at Tiflis, his father being a government official of German extraction and his mother a member of one of the oldest Russian noble families. After leaving the Odessa University he devoted some time to journalism, but in 1877 entered the railroad service, in which he showed the highest efficiency during the war with Turkey (1877-78). In 1879 he was called to St. Petersburg to be made railway manager, and was promoted rapidly until in 1892 he became Minister of Communications and soon afterwards of Finance. In the latter charge he introduced many reforms, increased the revenue, negotiated large loans abroad, and concluded important commercial treaties. In 1903 he was made President of the Committee of Ministers and a member of that of the empire. In 1905 he was the chief Russian plenipotentiary in the negotiations at Portsmouth, New Hampshire, yielding the treaty of peace between Russia and Japan. Died in 1915.

Witten (vit'en), a town of Prussia, in the province of Westphalia, 32 miles W. N. W. of Arnsberg, on the Ruhr. The chief industries are connected with iron and steel, lead, chemicals, plate-glass, fire-brick, etc. Pop. 35,841.

Wittenberg (vit'en-burg), a town in Prussia, province of Saxony, on the right bank of the Elbe, 45 miles southeast of Magdeburg. It was while Luther was a professor in Wittenberg that he nailed his ninety-five theses to the door of the Schlosskirche. The university of which he was professor was united to Halle in 1817. The principal buildings are the Schlosskirche, in which both Luther and Melanchthon are buried; the Stadtkirche, where Luther and Melanchthon preached; the remains of the Augustine monastery, with Luther's apartments; the houses of Melanchthon and Cranach, the town hall, the gymnasium, etc. Pop. 20,332.

Wittenberge (vit'en-ber-ge), an industrial town of Prus-

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sia district of Potsdam, at the junction of the Stepenitz with the Elbe. Pop. 18,501.

Witwatersrand (wit-wą'tėrz-rant; 'White Water Range'), a ridge of land in the Transvaal, South Africa, about 100 miles long E. to W., in lat. 26° S. This is the greatest gold-yielding region in the world. Gold was discovered here in 1886, and was the proximate cause of the Boer war. The output has increased until it is nearly double that of the United States.

Woad (wōd), a cruciferous plant of the genus *Isatis*, the *I. tinctoria*, formerly cultivated to a great extent in Britain on account of the blue dye extracted from its pulped and fermented leaves. It is now, however, nearly superseded by indigo, which gives a stronger and finer blue. The ancient Britons are said to have colored their bodies with the dye procured from the woad plant. *Wild woad*, *weld*, or *wold* is the *Reseda Luteola*, a British plant, which yields a beautiful yellow dye. See *Dyer's-weed*.

Woburn (wō'burn), a city of Middlesex Co., Massachusetts, 10 miles N. W. of Boston. It has the largest leather-making establishments in New England; also has large manufactures of shoes, glue, chemicals. Pop. 15,308.

Wodan, or WODEN (wō'den), the Anglo-Saxon form of the name of the deity called by the Norse Odin. *Wednes*day derives its name from him, and his name is also seen in several place-names, as *Wednes*bury, etc. See *Odin*.

Woiwode, WAYWODE (wā'wōd) an old Slavonic name for a general, afterwards used as a title of civil rank and authority. The princes of Wallachia and Moldavia were called Woiwodes, and this title was also applied at an early period to the Polish kings.

Wolcott (wol'kot), JOHN, an English writer, generally known by his nom de plume of 'Peter Pindar,' was born in 1738; died in 1819. He studied medicine; resided some time in Jamaica, where he took clerical orders; and afterwards established himself in Cornwall, where he discovered the artistic genius of the painter Opie. He published a number of satirical poems, and in particular turned his humor upon George III. Between 1778 and 1808 he is said to have put forth some sixty satirical productions in verse, most of them now forgotten.

Wold, or WELD. See *Dyer's-weed*.

Wolf (wulf), a quadruped belonging to the digitigrade carnivora, and very closely related to the dog. The common European wolf (*Canis lupus*) is yellowish or fulvous gray; the hair is harsh and strong, the ears erect and pointed, the tail straight, or nearly so, and there is a blackish band or streak on the forelegs about the carpus. The height at the shoulder is from 27 to 29 inches. The wolf is swift of foot, crafty, and rapacious; a destructive enemy to the sheepcote and farm-yard; it associates in packs to hunt the larger quadrupeds, such as the deer, the elk, etc. When hard pressed with hunger these packs have been known to attack isolated travelers, and even to enter villages and carry off children. In general, however, wolves are cowardly and stealthy. Wolves are still plentiful in some parts of Europe, as in districts of

Common Wolf (*Canis lupus*).

France, Spain, Italy, Germany, Turkey and Russia; they probably ceased to exist in England about the end of the fifteenth century; the last of them in Scotland is said to have been killed by Cameron of Lochiel in 1680, while in Ireland they are known to have existed until at least the beginning of the eighteenth century. The wolf of North America is generally considered to be the same species as the European wolf, though individuals vary much in color and otherwise. The little prairie-wolf or coyote (*C. ochropus*), abounding on the plains of the western part of the United States, is a burrowing animal. The Tasmanian wolf is a marsupial.

Wolf (volf), FRIEDRICH AUGUST, a German critic and scholar, born in 1759; died in 1824. His fame as a critic rests upon his *Prolegomena to Homer* (1795), in which he endeavors to show that the *Odyssey* and *Iliad* in their present form are not the work of one hand, but of several. This opinion he further defended in his *Letters to Heyne* (1797). See *Homer*.

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Wolfe (wŭlf), CHARLES, the author of the *Ode on the Burial of Sir John Moore*, was born in Dublin in 1791; died in 1823. He was educated at Trinity College, Dublin, and it was while there that the poem which has secured his fame was published in the *Newry Telegraph* (1817). He was also the author of several other poems, and his *Remains* were published at Dublin (two vols., 1825).

Wolfe, JAMES, an English general, was born at Westerham, Kent, in 1727; entered the army and proceeded with his regiment to the Low Countries; took part in the battles of Dettingen, Fontenoy, Falkirk, Culloden and Laffeldt, being wounded in the last. After distinguished service against the French in America he was entrusted (1759) with an army of 8000 men with which to assault Quebec. During the night this small force scaled the Heights of Abraham, which commanded the town, and in the battle which took place next day the British were victorious; but General Wolfe was wounded in the engagement, and died in the moment of victory, his opponent, Montcalm, being also mortally wounded.

Wolfenbüttel (vol'fĕn-bŭt-l), a town in Brunswick, Germany, on the Oker, 7 miles south of Brunswick. It has a castle, town house, arsenal; a library of about 300,000 volumes, besides MSS.; a statue of Lessing, who was long librarian to the duke; a gymnasium, etc. Pop. 17,873.

Wolffian Bodies (wŭl'fi-an; after *Wolff*, the discoverer), in physiology, a term applied to certain bodies in the vertebrate embryo, preceding the two kidneys, whose functions they perform. As the fœtus advances they gradually disappear, their place being supplied by the true kidneys, except in fishes, in which they are permanent.

Wolf-fish. See *Sea-wolf*.

Wolfram (wŭlf'ram), a native tungstate of iron and manganese. Its color is generally a brownish or grayish black. It occurs massive and crystallized, and in concentric lamellar concretions, and is the ore from which the metal tungsten is usually obtained.

Wolfram von Eschenbach.

See *Eschenbach*.

Wolf's-bane, a poisonous plant of the genus *Aconitum* (*A. Napellus*). It is a native of Alpine pastures in Switzerland, and found in a wild state in one or two parts of England. See *Aconite*.

Wollaston (wŭl'as-tun), WILLIAM HYDE, a distinguished chemist, born in London in 1776; died in 1828. He was educated at Cambridge, took the degree of M.D., practiced as a physician in London, but finally devoted himself to scientific research. He was the inventor of the goniometer, an instrument for measuring the angles of crystals, and the discoverer of palladium and rhodium, and of the malleability of platinum.

Wollin (vol'in), an island of Prussia at the mouth of the Oder, on the north side of the Great Haff; length, 20 miles; breadth, from 3 to 10 miles. Fishing and cattle rearing are the chief employments of the people. Pop. about 15,000.

Wolseley (wŭlz'li), SIR GARNET JOSEPH, VISCOUNT WOLSELEY, a British general, was born near Dublin in 1833; died in 1913. He entered the army as ensign in 1852; took part in the second Burmese war (1852-53), where he was severely wounded; served with distinction in the Crimea, and was wounded at the siege of Sebastopol; engaged in the siege and capture of Lucknow during the Indian mutiny of 1857-58; and was employed in 1860 in the Chinese war. He was despatched to Canada in 1861, and again in 1867, having received command of the Red River expedition, which he carried to a successful issue. Three years afterwards Wolseley (now K.C.M.G. and major-general) was appointed to the command of an expedition to punish the King of Ashantee, and after a brief campaign he entered Coomassie (Feb., 1874) and received the submission of the king, being rewarded by a grant of £25,000 and the dignity of K.C.B. After the defeat of a British force by the Zulus in South Africa, in 1879, he was despatched as high commissioner, but before his arrival the Zulus had been defeated at Ulundi, and little remained for him to do. His next command was in Egypt, in 1882, where his forces successfully stormed the lines of Tel-el-Kebir and captured Arabi Pasha. For this he received the thanks of parliament and was created a baron, his army rank being also raised to that of general. His next appointment was as adjutant-general of the forces. When the Mahdi subdued the Soudan, and held General Gordon prisoner in Khartoum, Wolseley was despatched in 1884 with a relief expedition. He concentrated his forces at Korti, and sent a column across the desert to Khartoum, but before its arrival the place had fallen. On his return to England he was created a vis-

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count. In 1888 he was made ranger of Greenwich Park. From 1895 to 1900 he was commander-in-chief, being succeeded in the latter year by Lord Roberts. He is the author of the *Soldier's Pocket Book* (1869), etc.

Wolsey (wụl'si), THOMAS, CARDINAL, said to have been the son of a butcher, was born at Ipswich, England, in 1471. He was educated at Magdalen College, Oxford, where he took his degrees as a scholar of distinction. After quitting the university he was appointed to the parish of Lymington, in Somerset. Then he became a private chaplain to the Archbishop of Canterbury, one of the governors of Calais, chaplain to Henry VII, and latterly Dean of Lincoln. When Henry VIII became king the advancement of Wolsey was rapid. Successively he was appointed Canon of Windsor, Dean of York, Bishop of Lincoln, Archbishop of York, and his nomination as cardinal in 1515 and pope's legate in 1518 completed his ecclesiastical dignities. In 1515 he was also appointed lord-chancellor of the kingdom. He was twice a candidate for the papacy, and his power in England, as also his revenues, were only equaled by those of the crown. Part of his immense revenues he expended in display, and part more laudably for the advancement of learning. He projected on a magnificent scale the College of Christ Church, at Oxford; founded several lectures, and built the palace at Hampton Court, which he presented to the king. This rapid preferment by the king was largely the result of a remarkable series of diplomatic victories, in which Wolsey had been the means of enabling Henry to hold the balance between Francis I and the Emperor Charles V. His success in the region of politics terminated in the splendors of the Field of the Cloth of Gold (1520). In his ambitious career the cardinal had made many enemies, who were held in check so long as he retained the favor of his royal master. This favor Wolsey lost when he failed to obtain from Pope Clement a decision granting the king's divorce from Catharine of Aragon. Thenceforth the enemies of the fallen prelate harried him unmercifully. He was banished from court, stripped of his dignities, found guilty of a præmunire, and sentenced to imprisonment. Finally, after a brief respite, during which he was restored to some of his offices, and had returned to his see of York, he was arrested at Cawood Castle on a charge of high treason, and on his way to London as a prisoner he died in 1530 of dysentery at Leicester Abbey.

Wolstonecraft, MARY. See *Godwin, Mary.*

Wolverene. See *Glutton.*

Wolverhampton (wụl-ver-hamp'-tun), a municipal and parliamentary borough of England, county of Stafford, 13 miles N. W. of Birmingham. It contains the collegiate church of St. Peter, a Roman Catholic chapel designed by Pugin, an exchange, a market hall, art gallery, town hall, etc. It is situated in the heart of the Midland mining district, has extensive beds of coal and ironstone in its vicinity, is the largest manufacturing town in Stafford, and is known as the capital of the Black Country. The chief industries are the smelting of iron ore, and manufactures in brass, tin, steel papier-mâché, iron, galvanized iron, and chemicals. Pop. 95,333.

Woman's Christian Temperance Union. See *Temperance Societies.*

Woman Suffrage. See *Women's Rights.*

Wombat (wom'bat; *Phascolomys wombat*), a marsupial animal, a native of Australia and Tasmania. It is about 3 feet in length, and has coarse, almost bristly fur, of a general gray tint, mottled with black and white. It burrows, feeds on roots, and its flesh is said in fatness and flavor to resemble pork.

Wombat (*Phascolomys wombat*).

Women's Rights, the term applied to the demand made on behalf of women, for a legal, political, educational and social status equal to that of men on the basis of natural right and also of the right to a voice in public affairs as property holders and taxpayers. The first distinctive claim for equality in the employment, education and political liberty of women

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was that made in 1792 by Mary Wollstonecraft, in her *Vindication of the Rights of Women*. For the pioneers in a public movement in that direction, we must seek the United States, where a band of resolute women met in 1848 at Seneca Falls, New York, the first Women's Rights Convention ever held, at which the claim of suffrage for woman on equal terms with man was first definitely made, Elizabeth Cady Stanton being the prime mover in the demand. The movement was not confined to suffrage, but covered other fields of inequality between man and woman, and since that date the fight has gone on all along the line. The demand for property and educational rights has made more rapid progress than that for suffrage and in these directions there is little left to gain. At present, many colleges and universities admit women to a full course of instruction in all departments, most of those founded since 1840 receiving women on equal terms with men. Women have also colleges of their own, where full courses of instruction may be had, and also medical colleges as advanced in their courses as those confined to men. Full courses of study in legal science may also be obtained and courses in medicine have for years been open to women. In most of the States the legal profession is open to women, though few have as yet embarked in it. In regard to property rights, the same equality has been widely established, women retaining the control of their own property after marriage, instead of letting it fall to their husbands, as under the older system. In this respect there is now little distinction between the rights of men and women. For many years past the fight for equal rights of suffrage has been vigorously waged, and the progress of women in this direction has become notable, especially within the present century. In the United States, women now possess the right of suffrage in thirteen States: in Wyoming (1869), Colorado (1893), Utah (1896), Idaho (1896), Washington (1910), California (1911), Arizona, Kansas and Oregon (1912), Illinois (1913), Montana and Nevada (1914), New York (1917). Also Alaska Territory (1913). In 1917 Indiana, Ohio and Rhode Island gave women the right to vote for Presidential electors and North Dakota gave them municipal suffrage, this to be extended to Presidential electors in 1920. School suffrage for women prevails in some form in thirty-one States, tax-paying suffrage for women tax-payers in Montana, Louisiana and Michigan. Outside the United States woman suffrage has been successful in a number of countries. These include Australia and New Zealand, where full suffrage exists, also Norway, Finland, Iceland, Denmark and Isle of Man. In Great Britain women can vote for all public officials except members of parliament.

Suffrage for women exists in all the provinces of Canada except Quebec. They also have municipal suffrage on the same terms as men in the British Isles and in Sweden. In some other countries women suffrage has made progress. In Great Britain, before the European war, the demand for full suffrage took a new stage, proceeding from quiet demand to militant insistence. The House of Commons was assailed by bands of suffragists, many of whom willingly suffered imprisonment as martyrs to the cause. Punishment for their acts only inspired them to more vigorous attempts, the assault upon the Parliament being succeeded by attacks on private property, the assailants resorting to window breaking, etc. Many thinking women defended these methods on the ground that the struggle amounted to actual warfare and was due to the fact that women had been insulted and brutally treated while seeking the vote by peaceful measures. During the European war militant methods were desisted from and in 1917 the suffragists won a notable victory, 330 members of the House of Commons, out of 440 present, voting in their favor.

In the United States milder methods were adopted, yet more effective ones as the above record shows. The suffrage parades and conventions held in large cities have been dignified and impressive. In 1917, however, a method of picketing the White House at Washington was adopted by a small party of extremists and gave such annoyance that those taking part in it were imprisoned. The method was deemed unwarranted by the leaders in the movement.

A meeting of the National Woman Suffrage Association was held at Washington in 1910, it being addressed by President Taft, this being the first occasion in which this body had been addressed by a President of the United States. A monster petition, with 500,000 signatures, was at the same time presented to Congress, calling for the reference of the suffrage question to popular vote. This has developed into a demand for an amendment to the constitution establishing a national right of woman suffrage and in response to a message from President Wilson the Susan B. Anthony Amendment was passed by the House in January, 1918.

The industrial rights of women have

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been the subject of legislative enactment in many of the States during recent years, one of the latest notable events in this direction being a decision of the Supreme Court of Illinois in April, 1911, in which was upheld the law of 1909, which limited the employment of women in laundries, factories, etc., to ten hours in any one day. This decision, in connection with that of the Supreme Court of the United States upholding the Oregon ten-hour law, clearly establishes the right of a State to use its police power in restricting the freedom of contract, to their injury, of adult women. The Southern Conference on Women and Child Labor formed a permanent organization at Memphis, Tenn., in April, 1911, its purpose being to secure uniform legislation on hours and conditions of labor. Such legislation is generally demanded and is likely to take place.

Wonders of the World. In ancient times seven of these were enumerated. These were the Pyramids of Egypt, the Mausoleum of Artemisia, the temple of Diana at Ephesus, the Hanging Gardens of Babylon, the Colossus of Rhodes, the Statue of Jupiter Olympus and the Pharos of Alexandria.

Woo-Chang (wŏ-chang), a city of China, province of Hu-Pé, on the Yang-tse-kiang, opposite the city of Hankow. Pop. estimated at over 500,000.

Wood. See *Timber*.

Wood (wụd), ANTHONY, antiquary, born at Oxford in 1632; died in 1695. He was educated at Merton College, Oxford, where he took his degrees, and spent his life in examining and sifting the records of the university. The result of his laborious researches was published as *Historia et Antiquitates Universitatis Oxoniensis* (1674), this being a Latin translation of Wood's English treatise under the authority of the university. He was also the author of *Athenæ Oxonienses* (1691-92).

Wood, ELLEN, or PRICE, an English novelist, better known as *Mrs. Henry Wood*, born at Worcester in 1820; died in 1887. Among her many novels may be noted *East Lynne*, which has had an enormous success both as a book and a drama; *The Channings*, *St. Martin's Eve*, *A Life's Secret*, *Roland Yorke*, *Dene Hollow* and the *Johnnie Ludlow Stories*, reprinted from the *Argosy*.

Wood, FERNANDO, congressman, was born at Philadelphia about 1812. He became a merchant in New York, was elected to Congress by the Democrats in 1841, and in 1854 was elected mayor of New York, where he introduced various reforms. In 1861, when the southern states were seceding, he recommended that New York should secede and become a free city. He was reëlected to Congress in 1868, and remained a member until his death, February 13, 1881.

Wood, GEORGE B., an eminent physician, was born at Greenwich, New Jersey, in 1797; died in 1879. He was graduated in medicine from the University of Pennsylvania in 1818, became a professor in the Philadelphia College of Pharmacy, and in 1835 in the University of Pennsylvania, where he remained until 1860. He did much to advance the interests of the University, and in 1865 endowed there an auxiliary faculty of medicine. His medical works included a *Treatise on the Practice of Medicine*, a *Treatise on Therapeutics and Pharmacology*, a *Pharmacopœia*, and great part of the *United States Dispensatory*. All these were admirable works and highly useful in the study of medicine.

Wood, HORATIO C., physician, was born at Philadelphia in 1841. He was graduated from the University of Pennsylvania in 1862, and was appointed to professorships of medical botany and nervous diseases. He wrote much on medical and other subjects, his writings being *Essay on Thermic Fever, or Sunstroke; The Fresh Water Algæ of North America*, *A Study of Fever*, *A Treatise in Therapeutics*, and many papers on medicine, botany, and other branches of science.

Wood, JAMES FREDERIC, an American archbishop, was born in Philadelphia in 1813, educated in England, and became a bank cashier in Cincinnati. He joined the Roman Catholic Church in 1836, studied at Rome and became a priest, was made bishop of Philadelphia in 1860, and archbishop in 1875. He died June 20, 1883.

Wood, REV. JOHN GEORGE, naturalist, born in London in 1827; died suddenly at Coventry in 1889. He was an enthusiast in natural history, and published a large number of books on zoölogy and kindred subjects, which had great popularity.

Wood, LEONARD, physician and soldier, was born at Winchester, New Hampshire, in 1860. He was graduated from Harvard Medical School in 1884, and was appointed Assistant Surgeon in 1886, with rank of captain in 1891. He received a medal of honor for services against Geronimo in 1888. In 1898 he became colonel of Roosevelt's

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'Rough Rider' regiment and took part in the Spanish war, in which he was promoted brigadier-general. In 1899 he was appointed governor of Cuba, in which island he had much to do with stamping out yellow fever. He was made brigadier-general in the regular army in 1901, major-general in 1903; commanded in the Philippines 1906-08, and in Dec., 1909, was appointed chief of staff of the army.

Wood Ant, a common species of ants, found in woods, where it makes a great heap of vegetable fragments, beneath which it has numerous chambers and passages. It has the power of ejecting an acid secretion as a defense against enemies.

Woodbine (wud'bin), a name given the honeysuckle and also some other climbers, such as some kinds of ivy, the Virginia creeper, etc. Specially applied to *Cissus quinquefolia*, a vigorous climbing plant, supporting itself by means of its radiating tendrils.

Woodbury, DANIEL R., statesman, born at Francestown, New Hampshire, in 1789; died in 1851. He was admitted to the bar in 1812, was appointed judge of the Superior Court in 1817, and was elected governor of New Hampshire in 1823. He was a member of the United States Senate 1825-31, was appointed secretary of the navy by President Jackson in 1831 and secretary of the treasury in 1834, holding that position until 1841, when he was reëlected senator. In 1845 he succeeded Joseph Strong as a justice of the Supreme Court of the United States. A collection of his *Political, Judicial and Literary Writings* was published in 1852.

Woodchuck, the popular name of a rodent mammal, a species of the marmot tribe, the *Arctomys monax*, or ground-hog, common in the United States and Canada. It is of a heavy form, from 15 to 18 inches long, blackish or grizzled above and chestnut-red below. It excavates burrows in which it passes the winter in a dormant state.

Woodcock, a bird of the genus *Scolŏpax*, the *S. rusticŏla*, same genus as the snipe. It is widely distributed, being found in all parts of Europe, the north of Asia, and as far east as Japan. The bird is about 13 inches in length, the female being somewhat larger than the male. Its food is chiefly worms. The American woodcock (*Scolopax* or *Philoheles minor*) is a smaller bird, but very similar in plumage and habits.

Wood Engraving. See *Engraving.*

Wood-grouse. See *Capercailzie.*

Woodhouselee. See *Tytler.*

Wood-lark, a small species of lark, the *Alauda arborea*, not unfrequent in some parts of England, but rare in Scotland. Its song is more melodious than that of the skylark, but it does not consist of so great a variety of notes, nor is it so loud.

Woodlice. See *Slater.*

Wood-nymph, in ancient mythology a goddess of the wood, a dryad. In zoölogy this name is given to the beautiful lepidopterous insects of the genus *Endryas.*

Wood-oil, a balsamic substance (an oleo-resin) obtained from several species of Dipterocarpus growing in Pegu, Assam, and some of the islands of the Indian Archipelago. It is used medicinally, as a varnish, in lithographic ink, etc.

Woodpecker, a name for the birds belonging to the family Picidæ, and the order Scansores or climbers. They are characterized by their long, straight, angular beak, adapted for splitting the bark of trees; by their slender tongue, with its spines at the tip curved backwards to enable them to extract insects from crevices; and by their stiff tail, which acts as a prop to support them while climbing. The noise they make in tapping the bark of a tree to discover where an insect is lodged can be heard at a considerable distance. *Picus major, medius, minor,* and *viridis,* the green woodpecker, are European species. In America the most characteristic species are *P. principālis* or the ivory-billed woodpecker, *P. aurātus* or gold-winged woodpecker, and the Californian woodpecker (*Melanerpes formicivŏrus*).

Wood-pigeon. See *Ring-dove.*

Wood-pulp, the fibrous product of ground-up wood from which paper is made. This branch of manufacture has grown to enormous proportions, to supply the great demand for printing paper of recent years. Spruce, hemlock, and poplar are commonly employed and other trees and plants are coming into use, such as white fir, balsam, pine, cottonwood, etc., the wood being simply ground up finely and made into paper, or treated with chemical substances to yield a better product suitable for book purposes. The total use of wood for this purpose in the United States in 1910 was over 4,000,000 cords. The great consumption of pulp wood in

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the United States has led to a large demand from the extensive coniferous forests of Canada, to facilitate which the tariff has been taken off from Canadian wood-pulp. Wood-pulp has been applied to other purposes than papermaking, bricks, and even car-wheels, being made from it, while among its other products artificial silk may be named, the fine pulp being forced through minute holes in a plate and yielding threads of a smooth, silk-like finish and considerable strength. It can be woven into silk-like fabrics.

Woodruff (wụd'ruf), WOODROOF, the common name of plants of the genus *Asperŭla*, nat. order Rubiaceæ. The sweet woodruff (*A. odorăta*), with its whorled leaves and white blossom, is found plentifully in Britain in woods and shady places. The dried leaves are used to scent clothes and also to preserve them from the attacks of insects. The root of the dyer's woodruff (*A. tinctoria*) is used instead of madder.

Woods, LAKE OF THE. See *Lake of the Woods.*

Woods, KATHARINE PEARSON, novelist, born at Wheeling, West Virginia, in 1850. Her socialist novel, *Metzerott Shoemaker*, attracted much attention; others were *The Mark of the Beast*, *From Dusk to Dawn*, etc.

Woodsia (wụd'si-a), a widely distributed genus of polypodiaceous ferns. *W. hyperborea*, the flower-cup fern, is a very small species, much resembling *W. Perriniana*, forming tufts on rocks.

Wood-sorrel, the common name of *Oxălis Acetosella*, well known for the acidity of its leaves, and formerly used in medical practice as an antiscorbutic and a refrigerant.

Woodstock, a city and port of entry of Ontario, Canada, county seat of Oxford Co., on the Thames River, 30 miles E. N. E. of London. It is a place of considerable trade, and has various manufactures. Is a favorite summer resort. Pop. 9321.

Wood-swallow, a name given in Australia to a genus of birds (*Artămus*), family Ampelidæ or chatterers. One species (*A. sordidus*) is remarkable for its habit of hanging suspended from dead branches in clusters resembling swarms of bees.

Woodworth, SAMUEL, journalist and poet, born at Scituate, Massachusetts, in 1785; died in 1842. He was an editor on various journals, wrote *The Champions of Freedom* and several dramatic works, but is chiefly known for his popular poem, *The Old Oaken Bucket.*

Woo-Hoo, or WUHU (wö-hö), a treaty port of China, province of Ngan-Hoei, on the Yang-tse-kiang, about 50 miles above Nanking. Opened to trade in 1887 it has recently become of considerable commercial importance, the chief exports being rice, silk, feathers, hides and tea, and the chief import is opium. Pop. about 115,000.

Wool (wụl), that soft species of hair which grows on sheep and some other animals, as the alpaca, some species of goats, etc., which in fineness sometimes approaches to fur. Wool is divided into two classes — *short* or *carding wool*, seldom reaching over a length of 3 or 4 inches, and *long* or *combing wool*, varying in length from 4 to 8 inches, each class being subdivided into a variety of sorts, according to their fineness and soundness of the staple. Wools which unite a high degree of fineness and softness with considerable length of staple, bear a high price. English-bred sheep produce a good, strong, combing wool, that of the Scotch breeds being somewhat harsher and coarser. The finest carding wools were formerly exclusively obtained from Spain, the native country of the merino sheep, and at a later period extensively from Germany, where that breed had been successfully introduced and cultivated. Immense flocks of merinoes are now reared in the United States, Australia, South America, and Europe, the annual wool product of the United States, Russia and Argentina being about 325,000,000 pounds for each country, while that of Australia is about 750,000,000 pounds. The total European product is about 800,000,000 pounds; total world product 2,700,000,000 pounds.

Woolen Manufacture. The use of wool as an article of clothing dates from the earliest times, and no doubt it was made into cloth earlier than either flax or cotton. Among the ancient Jews wool was the staple material of clothing; and the woolen fabrics of ancient Greece and Rome attained special excellence. In time the Roman manufactures were carried to the countries in which Roman colonies had been established. In England the making of woolen cloth seems to have been introduced by the Romans, but it did not rise into importance as a national employment until much later. The woolen cloths of England were for a considerable time confined to the coarser fabrics of domestic manufacture, finer cloths being imported from the Continent, particularly from Brabant. At various times also the trade was

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hampered by many illiberal laws for its regulation, for prohibiting exportation, etc. In the early part of the eighteenth century Yorkshire began to assume an important position in woolen manufactures, and that county is now the chief seat of both the English worsteds and woolens. Scotland, especially the south, is famous for the sort of cloth called tweeds. The industry was introduced into the United States in the early colonial period as a household manufacture. It has now grown into one of the leading textile industries.

In making woolen cloth the essential processes, as carried on in modern factories, are:—(1) the *stapling* of the raw wool. In this process the stapler or sorter works at a table covered with wire netting, through which the dirt falls while the various qualities of wool are being separated. The wool is then ready to be put through the (2) *scouring* machine, where it passes on an endless apron into an oblong vat, which contains a steaming soapy solution. Here it is carried forward gently by means of rakes until it is thoroughly soaked and cleansed. After this it is taken to the (3) *drying* framework of wire netting, under which are situated steam-heated pipes. A fan-blast drives the heated air upwards through the wet wool, which lies on the wire netting, until it is all equally dried. When necessary this is the point in the process when it is 'dyed in the wool.' It is then ready for the (4) *willeying* or *teasing* machine, which consists of a revolving drum furnished with hooked teeth, close above which are set cylinders with hooked teeth moving in a contrary direction. The wool is fed in upon the drum, which whirls with great speed; and between the two sets of teeth working in opposite directions it is disentangled, torn, and cast out in fine, free fibers. With some classes of wool it is also necessary, at this stage, to remove suds and burrs by steeping them in a solution of sulphuric acid, or passing them through a burring machine, by which the burrs are extracted. The wool is now dry and brittle; and before submitting it to the process (5) of *carding*, it is sprinkled with oil and well beaten with staves in order to give it suppleness. This process of carding is accomplished by a series of three delicate and complex machines called a scribbler, an intermediate, and a finisher. These machines have various intricate cylinders and rollers, studded with teeth and working in opposite directions, over which the wool is passed until it is torn, interblended, and finally delivered from the finisher in a continuous flat lap. It is then cut into strips and passed (6) to the *condensing* machine, which rubs the strip into a soft, loose cord or sliver technically called a 'slubbing.' The wool is now ready for (7) *spinning* into yarn, and this is accomplished in a wool-spinning mule, which draws and twists the sliver into the required thinness, the process being essentially the same as in cotton-spinning. (See *Cotton-spinning.*) The wool, which has thus been brought into the form of yarn, is now fit for (8) *weaving* into woolen cloth. (See *Weaving.*) When it is taken out of the loom the cloth is washed, to free it from oil and other impurities, and also beaten while it lies in the water by wooden hammers moved by machinery, while it is again dyed if found necessary. After it has been scoured in water mixed with fuller's earth, the cloth undergoes a process of (9) *teaseling* and *shearing* (see *Teasel*), in which the pile or nap is first raised, and then cut to the proper length by machines. When this is done it is (10) steamed and pressed between polished iron plates in a hydraulic press.

In the manufacture of worsted yarn the long-staple wool fibers are brought as far as possible into a parallel condition by processes called *gilling* and *combing*. The wool, in a damp condition, is passed through a series of 'gill boxes,' in which steel gills or combs separate and straighten the fibers until, from the last box, it issues in a long sliver. In this condition it is run through a delicate combing machine; after a process of roving the thread is spun into yarn. Merinos, Thibets, empress and Henrietta cloths, alpacas and other kinds of dress goods are made from worsted yarns. The camel hair, cow hair and calf hair goods are of cheaper grades: most of these contain a considerable proportion of shoddy, the lower grades of wool and woolen waste. These belong more to the woolen than the worsted trade.

Woolner (wul'ner), THOMAS, sculptor, was born at Hadleigh, Suffolk, in 1825; educated at Ipswich; placed at the age of thirteen in the studio of William Behnes; exhibited his first notable life-size group, *The Death of Boadicea* (1844); and followed up this success with *Puck*, *Titania*, and *Eros and Euphrosyne*. Besides his well-known statues of Carlyle, Tennyson, Gladstone, Newman, Darwin, Kingsley, etc., his more celebrated works are: *Elaine with the Shield of Sir Lancelot*, *Ophelia*, *In Memoriam*, *Virgilia Bewailing the Banishment of Coriolanus*,

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and *Achilles and Pallas Shouting from the Trenches*. He was elected an A.R.A. 1871; R.A. in 1876. He has also achieved considerable success as a poet in the volumes entitled *My Beautiful Lady* (1863), *Pygmalion* (1884), *Silenus* (1884), and *Tiresias* (1886). He died in 1892.

Woolsack (wul'sak), a large square bag of wool, without back or arms, covered with red cloth, which forms the seat of the lord chancellor of England in his capacity of speaker of the House of Lords.

Woolsey, THEODORE DWIGHT, an eminent scholar, born at New York, October 31, 1801; died July 1, 1889. He was graduated from Yale College in 1820, studied law and theology, and was professor of Greek at Yale 1831-46, and then its president until 1871. From 1871 to 1881 he was president of the American revisers of the New Testament. He prepared editions of several of the Greek classic authors, and wrote *Introduction to the Study of International Law, The Religion of the Past and the Future*, and other works.

Woolson, CONSTANCE FENIMORE, novelist and poet, born at Claremont, New Hampshire, in 1838; died in 1894. Her works embrace *Castle Nowhere, Rodman the Keeper, Jupiter Lights, For the Major*, etc.

Wool-tree. See *Eriodendron*.

Woolwich (wul'ich), a town and parliamentary borough of England, county of London on the Thames, 8 miles below London Bridge. It stretches about 3 miles along the river, and owes its importance to the great arsenal, which has a circumference of 4 miles, and consists of gun and carriage factories, laboratory, barracks, ordnance departments, etc. At North Woolwich, on the opposite side of the river, many houses and extensive factories have recently sprung up. Pop. 121,408.

Woonsocket (wön-sok'et), a city of Providence Co., Rhode Island, on the Blackstone River, about 40 miles S.W. of Boston. It is claimed to be the largest producer of woolen goods of any city in the United States, and has extensive cotton mills, employing over 4000 hands. There are also rubber shoe, yarn and machinery works, etc. Pop. 38,125.

Woorali Poison. See *Curari*.

Wooster (wös'tėr), a manufacturing city, capital of Wayne Co., Ohio. It is the seat of the University of Wooster, founded in 1870, and of the Ohio Agricultural Experiment Station. Plows, whips, furniture, coach-pads, foundry and lumber products are manufactured. Pop. 6136.

Wootz (wötz), a superior steel from the East Indies, imported into Europe and America for making the finest classes of edge-tools.

Worcester (wus'tėr), capital of Worcestershire, and one of the most ancient cities in England, lies on the eastern bank of the Severn, 114 miles N. W. of London. Its most notable building is a Gothic cathedral, originally built in 680 and rebuilt in the beginning of the thirteenth century. Constructed in the form of a double cross, with a central tower, it has been added to at various periods, and a very complete restoration was made in 1857. Among other buildings are the shire hall, the guildhall, corn exchange, museum of natural history, etc. Worcester is the chief seat of the English leather glove trade, has celebrated porcelain works, with foundries, carriage factories, and other works. Pop. 47,987. The county is bounded N. by Shropshire and Staffordshire, E. by Warwickshire, S. by Gloucestershire and W. by Herefordshire; area, 751 sq. miles, about half of which is in permanent pasture. The surface is a broad plain varied by the Malvern Hills in the S. W., several valleys, of which the Severn is the most notable, and having as its chief rivers the Severn, Stour, Teme and Avon. Wheat is extensively grown, while hop gardens are numerous. Coal and iron are worked; there are large manufactures of iron, steel, and hardware; and salt is obtained abundantly from the salt springs at Droitwich. The carpets of Kidderminster are famous, as are also gloves and porcelain of Worcester, and there are important glass manufactures at Dudley and Stourbridge. Pop. 526,143.

Worcester, a city, and one of the shore towns of Worcester Co., Massachusetts, lies on the Blackstone River, 44 miles west of Boston. It is the second city of the State, and has many notable edifices, including the city hall, public library, State armory, Clark University, Polytechnic Institute, Holy Cross College, American Antiquarian Society, Odd Fellows' Home, and an Art Museum with endowment of $4,000,000. Its industries are large and varied, its wire works being the largest in the world. There are also great loom and envelope works, woolen and mohair mills, large carpet works, boot and shoe factories, and many other industries. Worcester was permanently settled in 1713; incorpo-

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rated as a city in 1848. Pop. (1913) 166,205.

Worcester, EDWARD SOMERSET, MARQUIS OF, one of the earliest inventors of a steam engine, was born about 1601; died in 1667. He was engaged in the service of Charles I during the civil war, and was imprisoned in the Tower from 1652-55. He afterwards published *Scantlings of One Hundred Inventions*, in which he gave a description of his steam engine.

Worcester, ELWOOD, American clergyman, and author, born in Masilon, Ohio, in 1886. Since 1904 he has been rector of Emmanuel Church, Boston. Soon after 1904 he inaugurated a movement for the treatment of nervous diseases which attracted widespread interest. His books include *Religion and Medicine* (1907), and *The Living Word* (1908).

Worcester, JOSEPH EMERSON, a distinguished lexicographer, born at Bedford, New Hampshire, in 1784. His first work was a *Geographical Dictionary, or Universal Gazetteer*. It was followed by *Gazetteer of the United States, Elements of Geography, Sketches of the Earth and its Inhabitants* and *Elements of History*. In 1830 he published a *Comprehensive Pronouncing and Explanatory English Dictionary*. In 1860 he published the great quarto *Dictionary of the English Language* (illustrated). He died October 27, 1865.

Worden, JOHN, naval officer born at Sing Sing, New York, in 1818; died in 1897. He entered the navy as a midshipman in 1834, and at the beginning of the Civil war was taken prisoner by the Confederates, being exchanged after seven months. His most eminent service in the war was as captain of the *Monitor* in its famous fight with the *Merrimac* in Hampton Roads. He comanded the iron-clad *Montauk* in its operations against Fort Sumter, was made commodore in 1868 and rear-admiral in 1872, and retired in 1886.

Wordsworth (wards'wurth), CHRISTOPHER, youngest brother of William Wordsworth, was born at Cockermouth in 1774; died in 1846. He was the author of *Ecclesiastical Biography* and other works.

Wordsworth, WILLIAM, a celebrated English poet, son of an attorney, was born at Cockermouth, Cumberland, April 7, 1770; died April 23, 1850. In 1787 he was sent to St. John's College, Cambridge. He left the university after taking his degree, but without having otherwise distinguished himself, and lived aimlessly in London and elsewhere. He crossed to France in 1791, and exhibited vehement sympathy with the revolution, remaining in France for nearly a year. After his return, disregarding all entreaties to enter upon a professional career, he published his *Evening Walk* and *Descriptive Sketches* (1793). Two years afterwards he received a legacy of £900 from Raisley Calvert, a friend whom he had nursed in his last illness. With this sum and the consecrated helpfulness of his sister Dorothy he contrived to keep house for eight years, while he gave himself to poetic effort as his high 'office upon earth.' For the first two years they lived at Racedown in Dorset, where the poet, among other experiments, began his tragedy of *The Borderers*. In this retreat they were visited (1797) by Coleridge, who had already recognized an original poetic genius in the author of *Descriptive Sketches*. Coleridge was at this time living at Nether Stowey, in Somerset, and during this visit he induced the Wordsworths to go into residence at Alfoxden, in his immediate neighborhood. Here the two poets held daily intercourse, and after a twelvemonth they published *Lyrical Ballads* (1798) in literary copartnership. Although this volume was received with almost complete public indifference, yet Wordsworth felt that he had found his mission, and after a winter spent in Germany he and his sister settled at Grasmere (1799), where he proposed to write a great philosophical poem on man, nature, and society. Thenceforth his life was marked by few incidents. Those worth noting are his marriage in 1802 with his cousin Mary Hutchison; a removal from Grasmere to Allan Bank in 1808; his appointment in 1813 to an inspectorship of stamps, and his removal to Rydal Mount; several journeys into Scotland and to the continent; his acceptance of a D.C.L. degree conferred upon him in 1839 by the University of Oxford; and his accession in 1843 to the laureateship on the death of Southey. Wordsworth's great philosophic poem, which, in his own phrase, was to be the Gothic cathedral of his labor, received only a fragmentary accomplishment in *The Prelude*, *The Excursion*, and *The Recluse*. Yet enough was achieved in his smaller poems to justify his own conception of himself as a 'dedicated spirit,' and to set him apart among the greatest of England's poets. A complete edition of his poetical works has been published by Professor Knight, his prose writings have been collected and published by Dr. Grosart, his Memoirs were published in 1851 by his

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nephew, and an interesting account of the poet and his sister Dorothy is found in her *Diary of a Tour in the Highlands.*

Work (wurk), in mechanics, the act of producing a change of configuration in a system in opposition to a force which resists that change. According to physicists a *unit of work* is taken as a weight of one pound lifted one foot. See *Foot-pound, Unit, Energy.*

Workhouse, a house in which paupers are maintained at the public expense, those who are able-bodied being compelled to work. Under the old poor-laws of England, there was a workhouse in each parish, partaking of the character of a bridewell, where indigent, vagrant, and idle people were set to work, and supplied with food and clothing, or what is termed *indoor relief.* These workhouses were described as, generally speaking, nurseries of idleness, ignorance, and vice; but a new system was introduced in 1834, parishes being now united for the better management of workhouses, which gave rise to the poor-law unions, with their workhouses. In these establishments the pauper inmates are employed according to their capacity and ability. Religious and secular instruction is supplied, while habits of industry, cleanliness, and order are enforced. Similar institutions exist in the United States. See *Poor.*

Workington (wur'king-tun), a market-town and seaport of England, county of Cumberland, near the mouth of the Derwent, about 6 miles N. of Whitehaven. Its industrial establishments comprise large iron-smelting works and works for steel rails, iron-plates, ship-building, etc. Pop. 25,099.

Workmen's Compensation Laws. Laws relating to the compensation of workmen for injuries sustained have been passed by many states. In nearly all the states of the Union the laws of employers' liability have been modernized, but only in a few states do these acts apply to all servants and are therefore 'compensation acts.'

Worksop (wurk'sup), a market town of England, in Nottinghamshire, 26 miles N. of Nottingham. It has a beautiful Norman church, iron-foundries and saw-mills. Pop. 20,387.

World (wurld), in its widest sense signifies the universe, the total of all existing things. In its narrower sense it means the earth, its figure, dimensions, mass, and all else related to it. It is often spoken of also as the total of human beings, 'the world of man'; also of a specific group, as 'the literary world.'

World Scouts, an outgrowth from the Boy Scouts idea, the chief difference being that it is divested of all military significance, and based on the principle that all mankind constitute one family, and that in a strict sense there are no foreigners. It originated with Sir Francis Vane, who was concerned with General Baden-Powell in organizing the Boy Scouts. Not relishing the military aspect of the latter, he devised this new idea. It has had wonderful success, its membership going up to 50,000 in a few months, and spreading over Europe, though not yet to the United States. The rules of helpfulness, etc., are similar to those of the Boy Scouts (which see). The American Boy Scouts are essentially non-military.

Worms (wurms), a term loosely applied to many small longish creeping animals, entirely wanting feet or having but very short ones, including such various forms as the earth-worm, the larvæ or grubs of certain insects, intestinal parasites, as the tape-worm, thread-worm, etc. In zoölogical classifications it is used as equivalent to Vermes or to Annelida. In medicine it is applied to the parasitic animals which exist chiefly in the intestines, and to the disease due to the presence of such parasites. Several kinds of worms may infest the human body, but those with which children are so commonly annoyed are the small worms known as thread-worms. Vermifuges or anthelmintics are names given to medicines that cure worms, such as extract of male-fern root for tapeworms, santonin for thread-worms. See *Wormseed, Wormwood, Tapeworm* and *Nematelmia.*

Worms, (vōrms), one of the most ancient cities of Germany, is in the Grand-duchy of Hesse, on the Rhine, 25 miles S. of Mainz, and 20 miles N. W. of Heidelberg. The chief buildings of interest are the Romanesque cathedral (twelfth century), a magnificent structure with four round towers and two large domes; the Liebfrauenkirche and church of St. Martin; the town house; and the monument to Luther, consisting of a colossal statue on a raised platform surrounded by figures of precursors of or persons directly connected with the Reformation. At Worms was held the famous diet in 1521, at which Luther defended his doctrines before the Emperor Charles and an august assemblage. Pop. (1910) 46,819.

Wormseed, a seed which has the property of expelling worms from the intestinal tube or other open cavities of the body. It is brought

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from the Levant, and is the produce of a species of *Artemisia* (*A. Santonica*), which is a native of Tartary and Persia. In the United States the name is generally given to the seed of *Chenopodium anthelminticum*. See *Santonin* and *Erysimum*.

Wormwood (wurm'wŷd), the common name of several plants of the genus *Artemisia*. Common wormwood (*A. Absinthium*), a well-known plant, is celebrated for its intensely bitter tonic and stimulating qualities, which have caused it to be an ingredient in various medicinal preparations, and even in the preparation of liqueurs. It is also useful in destroying worms in children.

Worsted (wur'sted), a variety of woolen yarn or thread, spun from long-staple wool which has been combed, and which in the spinning is twisted harder than ordinary. It is knit or woven into stockings, carpets, etc. The name is derived from Worsted, a village in Norfolk where it is supposed to have been first manufactured. See *Woolen Manufacture*.

Wort. See *Brewing*.

Worth, William Jenkins, soldier, born at Hudson, New York, in 1794; died in 1849. He entered the army as a private in the war of 1812, became aid-de-camp to Generals Lewis and Scott, and fought at Chippewa and Lundy's Lane, being severely wounded at the latter battle. Promoted major in 1832 and colonel in 1838. He took command of the Florida war in 1841 and brought it to a successful termination. He served under General Taylor in the Mexican war, and distinguished himself at the storming of Monterey. He was afterwards placed in command of the Southwest.

Worthing (wur'thing), a watering-place in England, county of Sussex, about 10 miles west of Brighton. It is a fashionable resort, having an esplanade, libraries, a literary institution, reading-room, etc. There is also an extensive mackerel fishery. Pop. 30,308.

Worthington, Henry Rossiter, inventor, born at New York in 1817. He engaged in mercantile business, but in 1840 began a series of experiments with steam for the propulsion of canal boats. Soon afterward he devised a small steam pump to be used in the maintenance of the water supply in the engine boiler, and in 1841 patented an independent feed pump which developed into the direct-acting steam pump that he patented in 1849. Subsequently he built, in Savannah, Ga., the first direct-acting compound engine ever used in water-works; erected a large plant for the manufacturing of pumping machinery; invented the duplex pump, and devised various improvements in steam and hydraulic machinery. He died December 17, 1880.

Wotton (wot'ten), Sir Henry, a diplomatist and miscellaneous writer, born in 1568; died in 1639. He was educated at Winchester and Oxford; resided on the Continent for some years, and on returning to England was employed as secretary to Essex. On the fall of that nobleman from power (1600) Wotton fled to Florence, where he was employed by the grand-duke to reveal to King James of Scotland a plot against his life. When the Scottish king ascended the throne of England he showed his gratitude by making Wotton a knight, employing him abroad as an ambassador, and ultimately (1625) appointing him provost of Eton. His ability as a writer is shown in *Reliquiæ Wottonianæ*, published in 1651, with Izaak Walton's *Life of Wotton*.

Wound, in surgical phrase, a break or loss of continuity in any of the soft parts of the body occasioned by external violence, and attended with a greater or less amount of bleeding. Wounds have been classified as follows: (*a*) *Cuts, incisions*, or *incised wounds*, which are produced by sharp-edged instruments. (*b*) *Stabs* or *punctured wounds*, made by the thrusts of pointed weapons. (*c*) *Contused wounds*, produced by the violent application of hard, blunt, obtuse bodies to the soft parts. (*d*) *Lacerated wounds*, in which there is tearing or laceration, as by some rough instrument. (*e*) All those common injuries called *gunshot wounds*. (*f*) *Poisoned wounds*, those complicated with the introduction of some poison or venom into the part. Recent success in accelerating the growth of tissues seems likely to revolutionize the treatment of wounds.

Wouverman (vou'vêr-mân), Philip, Dutch painter, born in 1620; died in 1668. He was the son of Paul Wouverman, a historical painter, who taught him the rudiments of the art. The subjects in which he excelled were huntings, hawkings, encampments of armies, farriers' shops, and all such scenes as admitted the treatment of horses and other animals.

Wrack (rak), or Sea-wrack, a popular name for sea-weed cast ashore by the waves, but sometimes applied specifically to the genus *Fucus*. See *Fucaceæ*.

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Wrangler (rang'gler), in Cambridge University, the name given to those who have attained the first class in the public examination for honors in mathematics, commonly called the *mathematical tripos*. The student taking absolutely the first place is called the *senior wrangler*.

Wrasse (ras), the name of various species of fish belonging to the family Labridæ. They are prickly-spined, hard-boned fishes, with large double and fleshy lips. Several species are natives of the British seas, as the ballan wrasse, or old wife (*Labrus tinca* or *maculatus*), which attains a length of about 18 inches.

Wren (ren), a name given to certain birds closely allied to the warblers, distinguished by their small size, slender beak, short, rounded wings, mottled plumage, and the habit of holding the tail erect. The wren proper (*Troglodytes vulgaris*) is, with the exception of the golden-crested wren, the smallest bird in Europe, averaging about 4 inches in length. It is a well-known bird, and has rather a bold loud song. The American house-wren (*T. domesticus*) is a very familiar bird, and a general favorite in the United States.

Wren, Sir Christopher, an English architect, born in 1631; died in 1732. He was educated at Wadham College, Oxford; became a fellow of All Souls in 1653; was appointed professor of astronomy at Gresham College in 1657, and three years afterwards was elected Savilian professor of astronomy at Oxford. He had been appointed by Charles II to restore old St. Paul's, but after the great fire (1666) it became necessary to rebuild the cathedral. In preparing his plans he was considerably hampered by the ecclesiastical authority, but with the king's permission he modified and improved the design as the building proceeded. Thus, the division of the exterior into two orders of columns, and the present dome and drum on which it stands were alterations on the original plan. The cathedral was begun in 1675, and the architect saw the last stone laid by his son thirty-five years afterwards. Among the other notable buildings which Wren designed are: the modern part of the palace at Hampton Court, the library of Trinity College, Cambridge, the hospitals of Chelsea and Greenwich, the churches of St. Stephen's, Walbrook; St. Mary-le-bow; St. Michael, Cornhill; St. Bride, Fleet Street; as also the campanile of Christ Church, Oxford. In 1680 he was chosen president of the Royal Society, appointed in 1708 surveyor of the royal works, and from 1685 to 1700 represented various boroughs in parliament. Over the north doorway of St. Paul's is a memorial tablet on which are the well-known words: *Si monumentum requiris, circumspice.* See *Paul's, St.*

Wrench, an instrument consisting essentially of a bar of metal having jaws adapted to catch upon the head of a bolt or a nut to turn it; a screw-key. Some wrenches have a variety of jaws to suit different sizes and shapes of nuts and bolts, and others, as the monkey-wrench, have an adjustable inner jaw.

Wrenches.

1, Screw-wrench. 2, Tap-wrench. 3, Angle-wrench. 4, Tube-wrench. 5, Monkey-wrench for hexagonal and square nuts.

Wrexham (reks'am), a municipal and parliamentary borough of North Wales, county of Denbigh, 12 miles south of Chester. Its church of St. Giles, built about 1470, is one of the finest old Gothic buildings in North Wales. The town has large breweries, tanneries, paper-mills, etc., and the district has numerous coal, lead, and iron mines. Pop. 20,498.

Wright, Carroll Davidson, statistician, was born at Dumbarton, New Hampshire, in 1840. He served in the Civil war, rising from private to colonel, was chief of the Massachusetts bureau of statistics 1873-88, and United States Commissioner of Labor after 1885. In 1902 he became president of Clark College. He published *Industrial Evolution of the United States, Outline of Practical Sociology*, etc. He died in 1909.

Wright (rit), Horatio Gouverneur, general, born at Clinton, Connecticut, in 1820; died in 1899. He was graduated from West Point in 1841, and after some service in the army was promoted major in 1861. He served through the Civil war, was made brigadier-general of volunteers, commanded a division at the Wilderness and a corps at Spotsylvania and Cold Harbor, and was promoted major-general in the United States army in 1865. He was chief of engineers at the time of his retirement in 1884.

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Wright, Orville, born at Dayton, Ohio, in 1871, and Wilbur, born near Millville, Indiana, in 1867, brother aeronauts, the first to succeed in inventing heavier-than-air flying machines capable of bearing the weight of a man in the air. The earliest successful test of their machines was made at Kitty Hawk, North Carolina, in 1903, and the first successful long distance flight near Dayton in 1905. After that time they made numerous flights in the United States and Europe, and were awarded gold medals by the French Academy of Sciences and many other institutions. In 1909 they took charge of the Government aviation school at College Park, Maryland, but in 1910 returned to Dayton to manufacture aeroplanes under their patent. Wilbur Wright died in 1912.

Wrist. See *Hand.*

Writ (rit), in law, a mandatory precept, issued by the authority and in the name of the sovereign or the State, for the purpose of compelling the defendant to do something therein mentioned. It is issued by a court or other competent jurisdiction, and is returnable to the same. It is to be under seal, and attested by the proper officer, and is directed to the sheriff, or other officer legally authorized to execute the same.

Writer's Cramp, a spasmodic affection in which the patient loses complete control over the muscles of the thumb and the fore and middle fingers, so that all attempts to write regularly, and in the severer cases even legibly, are unsuccessful. It is a tetanic contraction of the muscles of the hand and forearm. It may be due to cold, rheumatism, exhaustion of the muscles by long-continued strain, or infection by bacteria. It is treated differently, according to its cause, such as by heat, antirheumatic remedies, rest, bacterial vaccines, massage, etc. Called also *Scrivener's Palsy.*

Writers to the Signet. See *Signet.*

Writing (rī'ting), one of the oldest arts, is usually divided into *ideographic writing,* in which signs represent ideas, and into *phonetic writing,* in which signs represent sounds. Ideographic writing, in its earliest form, is supposed to have been an attempt to convey ideas by copying objects direct from nature, and this form of it has thus acquired the name of *picture-writing.* After this came symbolical writing, in which abbreviated pictures were used as arbitrary symbols, first of things, and still later of sounds and words. This indicates the transition into phonetic writing, in which the signs may either represent a whole syllable (*syllabic writing*), or only a single sound, in which case they are called *alphabetic.* These signs differ in form and use in the various alphabets. Thus the Chinese signs are read in columns from top to bottom, the Mexican picture writing from bottom to top, the Hebrew writing from right to left, and Latin, Greek, and all European languages as well as Sanskrit from left to right.

Wood Writing Tablet.

(See *Alphabet.*) In the Chinese system of writing there is no alphabet, the characters being syllabic and strictly ideographic.

Writing was introduced to the western nations by the Phœnicians, and the Phœnician system is supposed to have been based on the Egyptian. The cuneiform writing, another ancient system, invented by the Accadian inhabitants of Chaldea, was also adapted to several languages, as the Assyrian, the Persian, etc., in a variety of ways, ideographic, syllabic, and alphabetic (see

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Cuneiform Writing). Also of independent origin is the Chinese system. The Egyptians had three distinct kinds of writing, the hieroglyphic, the hieratic, and the enchorial or demotic (see *Hieroglyphic*), and it was from the second that the Phœnician and other Semitic systems of writing are thought to have been derived. The leading Semitic forms are the Samaritan or ancient Hebrew, the Chaldee or East Aramaic, the Syriac or West Aramaic, the Kufic or early Arabic, and the Neshki or modern Arabic. At what time writing was introduced into ancient Greece is not known with certainty, but probably between the tenth and the seventh century B. C. From Greece it passed to Sicily and Italy, and thence it was spread as Christianity spread. Like the Semites, the Greeks originally wrote from right to left. In mediæval manuscripts a variety of styles were adopted in different epochs and countries. Capitals were not then used as now to distinguish prominent words, but whole manuscripts were written in large or small capitals. Uncial letters, which prevailed from the seventh to the tenth centuries, were rounded capitals with few hair-strokes. Gothic characters, which were merely fanciful deviations from the Roman types, became common in inscriptions from the thirteenth to the fifteenth centuries, and were employed in church books from the time of St. Louis. In England a variety of styles called Saxon prevailed in the early middle ages. A mixed style was formed of a combination of Roman, Lombardic and Saxon characters; the Norman style came in with William the Conqueror; and the English court hand, an adaptation of Saxon, prevailed from the sixteenth century to the reign of George II. There have been various attempts made to introduce systems of *phonetic writing*, in which each sound should be represented by one invariable sign. Systems of shorthand writing are generally phonetic. See *Shorthand*.

Buffalo Skin Writing.

Wryneck (rī'nek), a bird allied to and resembling the woodpeckers. One species, the common wryneck (*Yunx torquilla*), is a summer visitant of the north of Europe. It is remarkable for its long tongue, its power of protruding and retracting it, and the writhing, snake-like motion which it can impart to its neck without moving the rest of the body. It feeds chiefly on insects.

Wuhu. See *Woo-Hoo*.

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Wundt (vönt), WILHELM MAX, a German physiologist and psychologist, born at Neckarau in Baden, August 16, 1832. The list of his works is long and comprehensive, including physiology, psychology, logic and ethics. He believes that the straight road to ethics lies through studying the history of the race and its psychology. His comprehensive *System der Philosophie* is widely known.

Württemberg (vŭr-tem-ber*h*), or WÜRTEMBERG, a kingdom of the German Empire, between Bavaria, Baden, Hohenzollern, and the Lake of Constance, which separates it from Switzerland; area, 7531 sq. miles; pop. 2,435,000. Except a few tracts in the south, the surface is hilly and even mountainous. In the west the Schwarzwald, or Black Forest (which see), forms part of the boundary, and the Alb or Rauhe Alp, forming part of the Franconian Jura, covers an extensive tract. The country belongs in large part to the basin of the Rhine, being drained northwards into that river by the Neckar, while the Danube flows across the southern districts. A part of the Lake of Constance is also included in Württemberg. The climate is decidedly temperate. In the lower and more favorable districts the fig and melon ripen in the open air, and the vine, cultivated on an extensive scale, produces several first-class wines; maize, wheat, hops, tobacco, and apples, which are employed in cider making, are largely cultivated. About a third of the country is under forests which consist chiefly of oaks, beeches, and pine. Of minerals, by far the most valuable are iron and salt, both of which are worked by the government; the others are limestone, gypsum, alabaster, slate, millstones, and potter's clay. The manufactures consist chiefly of cotton, woolen, and linen goods, paper, wooden clocks, toys, musical instruments, and chemical products. The government is an hereditary constitutional monarchy, the executive power being lodged in the sovereign, and the legislative jointly in the sovereign and a parliament, composed of an upper and a lower chamber. In the Bundesrath Württemberg is represented by four members, and in the Reichstag by seventeen. Education is generally diffused, and the center of the educational system is the University of Tübingen. Besides Stuttgart (the capital), the chief towns are Ulm, Heilbronn, and Esslingen. The history of the state is of little general interest. In the war of 1866 Württemberg sided with Austria against Prussia. It became a member of the German Empire on its foundation in 1871.

Würzburg (vurts'bur*h*), a town in the northwest of Bavaria, on the Main, 60 miles S. E. of Frankfort. Its old fortifications have been demolished, and the site laid out in fine promenades, but it is still overlooked by the fortress of Marienberg, on a lofty hill outside the city. The most important edifices are the Romanesque cathedral, erected in the tenth century, with an interior highly enriched but much deteriorated by plaster decoration of the eighteenth century; the university, with various new buildings; the Julius hospital and school of medicine, and the royal palace (1720-44). The university library has 200,000 volumes, and in other respects the university, especially in the medical faculty, is well equipped. The manufactures are varied in character. Pop. (1910) 84,496.

Wurzen (vurt'sĕn), an old town of Germany, in Saxony, on the Mulde, with a cathedral, ancient castle, and important industries. Pop. 17,212.

Wu-Ting-fang, diplomatist, was born in Hsin-hiu dist., Kwang-tung, China. He was educated in Chinese learning at Canton, in English at Hong-Kong, and studied law in London, being admitted to the English bar. He returned to China in 1877, and practiced law at Hong-Kong till 1882, when he was appointed deputy for foreign affairs at Tientsin. Here he was made chief director of the Kai Ping Railway and built the first railroad in China. In 1891 he was appointed director of the Tientsin University, was on the peace embassy to Japan in 1896, and aided in negotiating a treaty of Commerce with Japan. He was minister to the United States 1897-1902 and again 1907-11, and there wrote and lectured on Chinese subjects. He was active in the revolution in China of 1911-12, and was appointed Minister of Justice in the cabinet of the provisional government, and re-appointed minister to the United States in 1912.

Wyandots (wī'an-dotz; in Canada called *Hurons*), an Indian tribe in North America belonging to the Iroquois family. In the beginning of the seventeenth century they were settled on the eastern shore of Lake Huron, but in a tribal war (1636) they were nearly exterminated. Part of the dispersed tribe settled at Ancien Lorette in Lower Canada, where their descendants still remain.

Wyandotte (wī'an-dot), a city of Wayne Co., Michigan, on the Detroit River, 12 miles S. S. W. of Detroit. It has ship and boat yards, and manufactures of chemicals, salt,

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trunks, fur-robes, coats, malt liquors, auto trucks, stoves, etc. Pop. 8287.

Wyandotte, Kansas, is a part of Kansas City.

Wyandotte Cave, situated 5 miles N. of Leavenworth, Indiana, has been explored for over 20 miles, and rivals the Mammoth Cave in the size of some of its chambers and in its stalagmites and stalactites, surpassing the Mammoth Cave in the number and beauty of these. It is notable for its large chambers.

Wyatt (wī'at), SIR THOMAS, the first writer of sonnets in the English language, born in 1503; died in 1542. His poetical works were published in 1557.

Wyant (wī'ant), ALEXANDER H., landscape painter, was born at Port Washington, Ohio, in 1836. He studied at Carlsruhe, Germany, under Hans Gude, and made attractive studies in Ireland of the lakes of Killarney. His studies of autumn effects in American forests, and views of nature in the Adirondacks and along the Ohio river, have made his fame more than continental. He died November 29, 1892.

Wycherley (wich'er-li), WILLIAM, an English dramatist, born about 1640 at Clive, near Shrewsbury; died in 1715. His early years were spent in France, afterwards he was educated at Oxford, and entered himself at the Temple; while in 1670 he became known as a fashionable man about town and the author of *Love in a Wood*. This comedy was followed by the *Gentleman Dancing Master*, the *Country Wife*, and the *Plain Dealer*. In 1680 he married the Countess of Drogheda, a young, rich widow, who at her death left him a lawsuit, the expenses connected with which brought him to the Fleet Prison. Here he remained for seven years, until released and pensioned by James II. Wycherley is the typical dramatist of the Restoration group, in which all the brilliancy and dissoluteness of that school are very prominent.

Wych-hazel (wich'hā-zl), the common name of plants of the genus *Hamamelis*, the type of the nat. order Hamamelidaceæ. They are small trees, with alternate leaves on short petioles, and yellow flowers disposed in clusters in the axils of the leaves, and surrounded by a three-leaved involucrum. They are natives of North America, Persia, or China, and are very different from the true hazel. The Virginian wych-hazel is medicinally important. See *Hazeline*.

Wycliffe. See *Wickliffe*.

Wycombe (wik'um), HIGH or CHIPPING, a municipal borough of England, in Buckinghamshire, on the Wye, 34 miles N. W. of London. Its chief building is the Church of All Saints, built about 1273 A.D., and its chief manufactures are paper and lace. Pop. 24,558.

Wye (wī), a river of South Wales, which rises on Plynlimmon, in Montgomeryshire, passes through Radnorshire, Brecknockshire and Herefordshire, and falls into the Severn, after a course of 130 miles, near Chepstow, in Monmouthshire. Above the latter place it is only navigable by barges.

Wykeham (wik'am), WILLIAM OF, was born at Wykeham, Hampshire, in 1324; died in 1404. He received a liberal education from the lord of the manor of Wykeham, and was afterwards recommended by him to the notice of Edward III. Having taken holy orders he was elevated to the rich see of Winchester, and in 1367 was appointed to the chancellorship of England. He founded (1373) a grammar school at Winchester, which still exists; and about the same time founded a college at Oxford, now called New College. In the last years of his life he rebuilt Winchester Cathedral.

Wyntoun (win'tun), ANDREW, an ancient rhyming chronicler of Scotland, who lived in the early part of the fifteenth century, was a canon regular of St. Andrew's, as also prior of St. Serf's Inch, in Lochleven. His *Chronicle*, which is in the Scottish vernacular, and is called the *Orygynale Cronykil of Scotland*, begins with the creation of the world, and is brought down to the death of Robert III in 1406. The first five books contain an outline of general history and geography; the four remaining books dealing with the history of Scotland.

Wyoming (wī-ō'ming), one of the United States (admitted June, 1890). It is almost rectangular in shape, bounded S. by Utah and Colorado, N. by Montana; E. by Nebraska and South Dakota, and W. by Utah, Idaho and Montana; area, 97,575 square miles. The surface is to a large extent mountainous, the main chain of the Rocky Mountains extending from northwest to southeast. It is broken by deep river cañons and flat topped hills or buttes, which rise from the plain or valley like walled cities or mounds. Near are large elevated plateaus or parks, of which the principal is the great Yellowstone Park. The river system includes the Platte River with its tributaries in the south-

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east, the Green River in the southwest, and the Yellowstone, Big Horn and Powder rivers in the north. The mountainous districts abound in forests, and the soil of the valleys is a fertile loam very suitable for agriculture, but needing irrigation in great part of the State. It is claimed that 10,000,000 acres may be reclaimed in this way, and irrigation is being actively applied, there being more than 4500 miles of irrigating ditches. Wheat, oats and barley are the chief crops, and large tracts are used for stock-raising, which is the chief industry. Wyoming is rich in mineral resources Good coal is abundant and there are vast beds of iron ore, while gold and silver are plentiful. Other minerals are gypsum, salt, soda, sulphur, copper, lead and tin. Petroleum seems abundant in the central and southern sections. Of the larger animals grizzly and black bears and several species of deer are still abundant, but the buffalo, of which there used to be immense herds on the plains, have become extinct. The manufactures consist of the sawing of lumber and railroad ties, milling of quartz, and railroad repair and machine work in the railroad towns. Acquired as part of the Louisiana Purchase, this territory was organized in 1868, and is now being slowly developed, chiefly through means of the Union Pacific Railway, by which it is traversed. In the northwest the Yellowstone district has been set apart by the government as a great national park. See *Yellowstone National Park*. The capital is Cheyenne City. The State is rapidly increasing in population. Pop. (1910) 145,965.

Wyville Thomson Ridge. See *Atlantic Ocean*.

Wyoming Valley, in Luzerne Co., Pennsylvania, famous as the scene of a massacre of the American settlers by a band of Tories and Indians July 4, 1778. Nearly all the American fighting men were away in the Continental army and after a brief resistance the remaining men took refuge in Forty Fort, where most of the families of the valley had gathered. The Tories, under Colonel Butler, offered unexpectedly easy terms of surrender, and the settlers went back to their homes, while the invaders were supposed to be leaving the valley. Against the commands of their white leaders the Indians remained, and, on the night of July 4, began massacring the inhabitants and burning the houses. All who could escape made their way into the Wilkes-Barre Mountains and the swampy land beyond, where many of the women and children died. When peace was established the surviving settlers returned. A memorial marble monument is erected in the valley.

Wythe (with), George, an American patriot, born in Elizabeth City Co., Virginia, in 1726; died in 1806. He was elected to the Continental Congress in 1775, signed the Declaration of Independence in 1776, became in 1777 a judge of the High Court of Chancery, and served as chancellor of Virginia for twenty years. He was professor of law at William and Mary college 1779–89, and a delegate to the Constitutional Convention of 1787.

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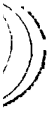

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X

X, the twenty-fourth letter of the English alphabet. Except when used at the beginning of a word, *x* in English is a double consonant, and has usually the sound of *ks*, as in *wax*, *lax*, *axis*, etc.; but when terminating a syllable, especially an initial syllable, if the syllable following it is open or accented, it often takes the sound of *gs*, as in *luxury*, *exhaust*, *exalt*, *exotic*, etc. At the beginning of a word it has precisely the sound of *z*.

X-Rays or *Roentgen Rays* (rĕnt'kĕn) or Roentgen Radiation, discovered by Wilhelm Conrad Röntgen of the University of Würtzburg, Germany, and announced by him in December, 1895. Prof. Röntgen named them *X-Rays* ('unknown quantity'), since their exact nature was unknown when they were discovered. They are invisible rays transmitted through the ether in a manner similar to light. They consist of very short, irregular, non-harmonic, electromagnetic pulses in the ether and are capable of passing through all substances in a remarkable manner, approximately in inverse proportion to the atomic mass of the material. They produce fluorescence and phosphorescence in many crystalline substances such as barium-platinocyanide, calcium tungstate, willemite, calc spar, fluorspar, rock salt, calcium sulphide, etc., giving a method of making their presence visible. They reduce the silver haloids of photographic emulsions; color crystals, gems and glasses; ionize air and other gases; excite secondary Roentgen Rays in all substances absorbing them; precipitate mercurous chloride from aqueous solutions of mercuric chloride and ammonium oxalate; reduce vitality of cell life (and in large amounts destroy it); and increase the velocity of a few chemical reactions. They are produced by passing uni-directional, electric current of from twenty to one hundred thousand volts pressure through a specially constructed high vacuum tube, within which, cathode rays radiating from the surface of a concave cathode are focussed upon and bombard a target of refractory material such as tungsten, iridium, or platinum, from which focus spot the Roentgen Rays radiate in all directions according to the law of inverse squares. They are used in medicine and surgery to photograph the skeleton and all the internal organs of the human body as an aid in diagnosis, also as a therapeutic agent to destroy diseased tissue with and without the aid of surgery. Cancers and tumors of certain kinds and a number of skin diseases are made to disappear by their use.

Xanthippe (zan-thip'ē). See *Socrates*.

Xanthorrhœa (zan-tho-rē'a). See *Grass-tree*.

Xanthoxylum (zan-thoks'i-lum). See *Prickly Ash*.

Xanthus (zan'thus), an ancient city of Asia Minor, in Lycia, on the river Xanthus, about 8 miles above its mouth. Its ruins were discovered in 1838 by Sir C. Fellows; and have yielded a large collection of marbles, now in the British Museum. The river rises in Mount Taurus, and falls into the Mediterranean a little to the west of Patara.

Xavier, St. Francis (zav'i-ėr; Spanish pron. hâv-i-er'), surnamed the apostle *of the Indies*, was born in 1506 at the castle Xavier in Navarre. He fell under the personal influence of Ignatius Loyola, and became one of the first members of Loyola's Society of Jesus. Under the auspices of John, King of Portugal, he went to the East Indies as a missionary in 1541. In 1549 he made his way to Japan. He was about to extend his field of labor to China, when he died in 1552. Canonized in 1621.

Xenia (zē'ni-a), a city, capital of Greene Co., Ohio, on the Little Miami River, 65 miles N. E. of Cincinnati. It is the seat of Zenia Theological Seminary and the Ohio Soldiers' and Sailors' Home. Wilberforce University, formerly here, is now at Wilberforce, 3 miles away. It has saw, planing and paper mills, marble and granite works; cordage, twine, shoes and other industries. Pop. 8706.

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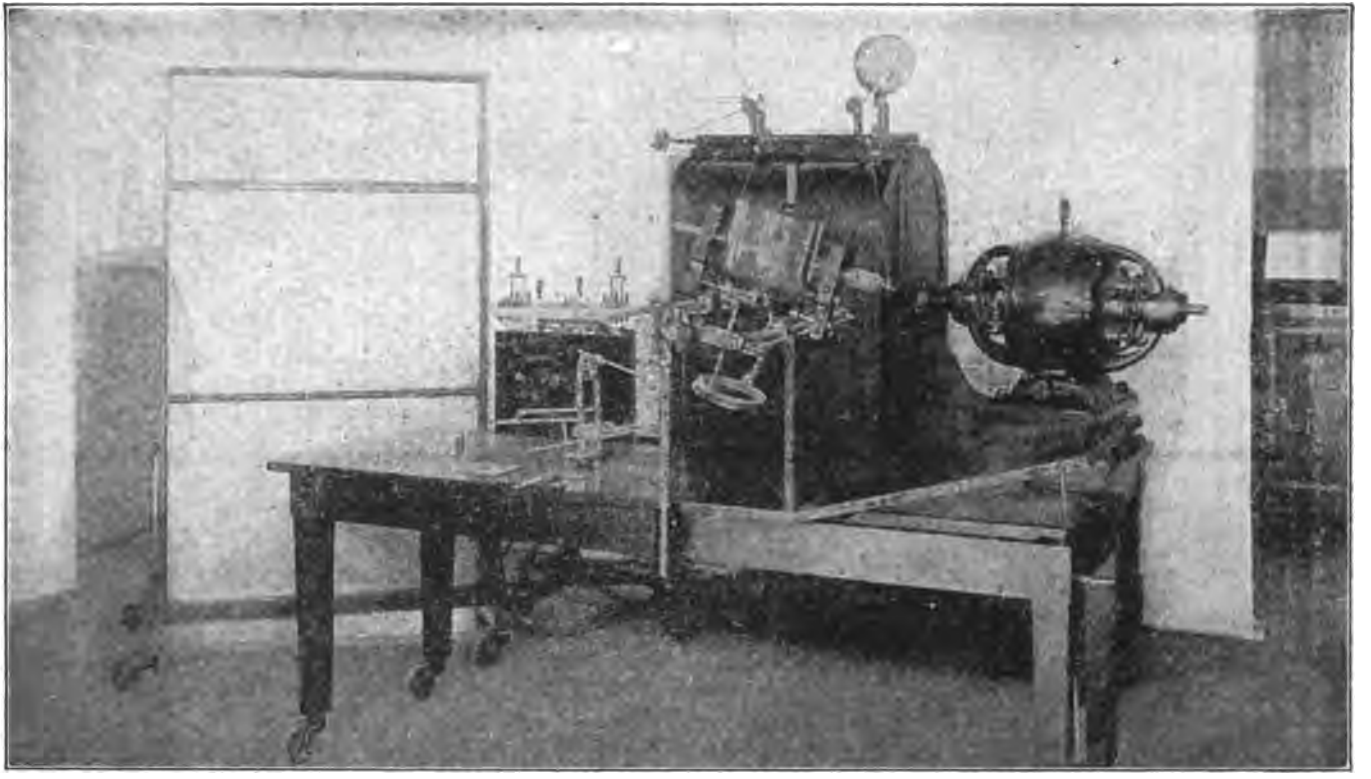

MODERN X-RAY APPARATUS

This is the most up-to-date development of the Roentgen Ray machine. The subject is placed on the long table in the foreground and the X-Ray tube in its lead glass shield container brought, by means of its adjustable carriage, over the part to which the rays are to be applied. The cabinet in the background contains the high-tension transformer and rectifier, the machine at the right is a rotary converter which drives the rectifier, and which, deriving power from the direct-current electric service, delivers alternating current to the high-tension transformer. The controlling switches are seen at the left of the cabinet.

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Xenocrates (ze-nok'ra-tēz), of Chalcedon, a Greek philosopher, and disciple of Plato, born 396 B.C.; and from 339 until his death, 314 B.C., head of the famous Academy at Athens. Metaphysics and ethics were his chief subjects, but of his numerous works only the titles are now known.

Xenophanes (ze-nof'a-nēz), of Colophon, a Greek philosopher, born probably about 330 B.C.; for some time settled at Elea, and regarded as the founder of the Eleatic school of philosophy. The character of his teaching has been much debated. He must have been at least seventy-two when he died. See *Eleatic School.*

Xenophon (zen'o-fon), a Greek historian and essayist, born at Athens about 430 B.C.; became early a disciple of Socrates. In 401 B.C., partly from curiosity, and in no military capacity, he joined the Greek mercenaries attached to the force led by Cyrus the Younger against his brother Artaxerxes II. After the defeat and death of Cyrus on the field of Cunaxa, the chief Greek officers were treacherously assassinated by the victorious satrap. Xenophon now came to the front, and mainly conducted the famous retreat of the 10,000 through wild and mountainous regions, often harassed by the guerrilla attacks of barbarous tribes, until after a five months' march they reached Trebizond on the Black Sea, February, 400 B.C. The expedition and its sequel form the subject of his best-known work, the *Anabasis.* Xenophon fought on the side of the Lacedæmonians in the subsequent war between Sparta and Persia, and rose from poverty to competence through the ransom which he received from a wealthy Persian nobleman whom he had captured. With Agesilaus, under whom he had already served, he fought at Coroneia (394 B.C.) against his own countrymen, and was on this account formally banished from Athens. For more than twenty years he seems to have lived the life of a country gentleman at Scyllus in Elis, where he is supposed to have written most of his works. After the defeat of the Spartans at Leuctra (371 B.C.), Xenophon was driven from Elis, and is said to have retired to Corinth. He was certainly alive in 357 B.C. Xenophon's principal works, besides the *Anabasis,* are his *Cyropædia,* a political and educational romance based on the history of Cyrus the Great; the *Hellenica,* a history of Greece where Thucydides leaves off, including the period from 411 to 362 B.C.; and the *Memorabilia,* recollections of Socrates.

Xeres. See *Jerez.*

Xerxes I (zerk'sēz), King of Persia, famous for his unsuccessful attempt to conquer Greece, was the son of Darius and of Atossa, daughter of Cyrus. He began to reign 485 B.C., and continued his father's preparations for another Persian invasion of Greece. The army which he collected is estimated to have exceeded a million of men, with a fleet of 1200 sail. Xerxes crossed the Hellespont on a bridge of boats (480 B.C.), and met with no resistance until he reached the Pass of Thermopylæ. After Leonidas had fallen there with his Spartans (see *Leonidas*), Xerxes pressed forward and burned Athens, which had been forsaken by almost all its inhabitants. He watched from the mainland the naval battle of Salamis (September, 480 B.C.), and fled ignominiously after the overwhelming defeat of his fleet. Xerxes was assassinated 465 B.C. He has been supposed to be the Ahasuerus of the *Book of Esther.*

Ximenes (*hi*-mā'nes), FRANCISCO, a Spanish cardinal, born in 1437; died in 1517. In 1492 he was appointed confessor to Queen Isabella of Castile, and in 1495 Archbishop of Toledo, distinguishing himself as a reformer of ecclesiastical and monastic abuses. In 1507 he was made a cardinal, and in 1516 King Ferdinand died, leaving Ximenes regent during his grandson Charles' absence in the Netherlands. In 1517 Charles returned to Spain, and, prompted by jealousy, dismissed him. Ximes died soon afterwards. He founded and endowed the University of Alcalá de Henares.

Xingu (shing-gō'), a river of Brazil, one of the chief tributaries of the Amazon, rises near lat. 15° S., lon. 59° W., and after flowing north for 1300 miles joins the Amazon 240 miles W. of Pará. It is navigable for 100 miles.

Xiphias. See *Sword-fish.*

Xiphodon (zif'o-don), a genus of fossil mammals closely allied to *Anoplotherium.*

Xyloc'opa. See *Carpenter-bee.*

Xylography (zī-log'ra-fi), a name sometimes given to wood-engraving.

Xylology (zī-lol'ō-ji), the science of wood-structure, of the identification of woods and the detection of substitutes. The chief value of the work of the xylologist at present is in discovering new woods with properties and structural characters similar to certain kinds which are being rapidly exhausted.

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Y

Y, the twenty-fifth letter of the English alphabet, was taken from the Latin, the Latin having borrowed it from the Greek T or upsilon. In modern English it is both a consonant and a vowel. At the beginning of syllables and followed by a vowel it is a consonant; in the middle and at the end of words it is a vowel.

Y, or IJ (both pronounced I), the western arm of the Zuider Zee on which Amsterdam is situated.

Yablonoi. See *Stanovoi Mountains.*

Yacht (yot), a light and elegantly fitted up vessel, used either for pleasure trips or racing, or as a vessel of state to convey kings, princes, etc., from one place to another by sea. There are two distinct species of yacht: the mere racer, with enormous spars and sails and deeply-ballasted hull, with fine lines, but sacrificing everything to speed; and the elegant, commodious, well-proportioned traveling yacht, often with steam-propelling machinery, fit for a voyage round the world. A type of yacht much used in America is that with a center-board or sort of movable keel. (See *Center-board.*) The practice of yachting as well as the word yacht was derived from the Dutch. The word yacht is found in use in English in Elizabeth's time, and James I had a yacht built for his son Henry early in the seventeenth century, but it was not till long after that yachting became a favorite pastime with the rich. The first yachting club in the British Kingdom was organized at Cork Harbor in 1720. The first yacht club in the United States was established at New York in 1844. In each country the yachts are now numbered by the thousand. In 1851 the *America,* built in New York, carried off a cup given by the Yacht Squadron at Cowes, and her victory led to considerable modifications of the build of British yachts. In subsequent international contests the American yachts have held their own, and the cup has never recrossed the Atlantic.

Yak, the *Bos* or *Poephagus grunniens,* a fine large species of ox, with cylindric horns, curving outward, long pendent silky hair fringing its sides, a bushy mane of fine hair, and long, silky, horse-like tail; inhabiting, both in the wild and the domesticated state, Tibet and the higher plateaus of the Himalayas; called *grunniens* (grunting) from its very peculiar voice, which sounds much like the grunt of a pig. It is the ordinary domestic animal of the inhabitants of those regions, supplying milk, food, and raiment, as well as being used as a beast of burden and to draw the plow. The tail of the yak is in great request for various ornamental purposes, and forms an article of commerce.

Yak (*Bos grunniens*).

Yakub Khan (yä-köb'), MAHOMED, Amir of Afghanistan. See *Afghanistan.*

Yakutsk (yä-kötsk'), a province of Eastern Siberia, includes nearly the whole of the basin of the Lena, between which river and its tributary, the Vitim, rich gold mines are worked. Area, 1,533,397 sq. miles. Pop. 261,731. YAKUTSK, capital of the province of the same name, stands on a branch of the Lena, and is the principal trade-center of Eastern Siberia. It was founded by the Cossacks in 1632. Pop. about 7000.

Yale (yāl), ELIHU, philanthropist, was born at Boston, Massachusetts, in 1648; died in 1721. He went to England while very young, was educated there, and never returned to the

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United States, becoming an East India merchant and acquiring great wealth. He gave books and money valued at $4000 to the Collegiate School at Saybrook, Connecticut, and after the removal of this school to New Haven it was named in consequence Yale College.

Yale, LINUS, inventor, born at Salisbury, New York, in 1821; died in 1868. In 1850 he began the study of mechanical problems, and in 1851 patented a safety lock. From this date until his death he was considered an authority in all matters relating to locks, his most notable invention being the double lock, which comprised two locks within a single case and operated by the same or different combinations. The 'Yale lock' is now in almost universal use.

Yale University (yāl), one of the oldest of the American universities, was originally a collegiate school established at Saybrook, Connecticut, in 1701. It was removed in 1716 to New Haven, and soon after its name was changed to Yale College, after its patron Elihu Yale (1648-1721). In 1887 its name was changed to Yale University by act of Assembly. It has four faculties — philosophy and arts, theology, law, and medicine — in all of which its governing body grants degrees. The first of these faculties includes, besides the original academical department, a scientific and engineering school — degrees for civil and dynamic engineering being given — and a school of fine arts. The aggregate number of volumes in all the libraries of the college is 600,000, of which 1000 were presented to it in 1730 by Bishop Berkeley. Its museum of natural history was endowed with $150,000 by George Peabody and the endowment of the university is over $13,000,000. The numerous buildings cover about nine acres in the heart of the city, the oldest dating from 1752. The teaching staff and members of faculty number over 410, and the average number of students over 3000.

Yam, a large esculent tuber or root produced by various plants of the genus *Dioscorea*, order Dioscoreaceæ, growing in the warmer regions of both hemispheres. Yams, when roasted or boiled, form a wholesome, palatable, and nutritious food, and are extensively cultivated in many tropical and sub-tropical countries. The Chinese or Japanese yam (*D. Batātas*) contains more nitrogenous and therefore nutritive matter, but less starch, than potatoes. It is hardy in Great Britain and thrives in the United States, but its cultivation is impeded by the great depth to which its roots descend. The tubers of *D. alāta*, the West Indian yam, one of the species most widely diffused, sometimes attain a weight of 50 lbs.

Yama (yam'a), a Hindu god, the judge of the dead, whose good and bad actions are read to him out of a record, and who according to their merits and demerits are sent to the celestial or to the infernal regions. Hindus offer to him daily oblations of water.

Yamagata, ARITOMO, a Japanese marquis and field-marshal; born in 1838. The son of a Samurai chieftain, he received a military education, and in 1868 took part in the suppression of the Shogunate. He became Minister of War in 1873, created a national army out of the feudal retainers, and in 1877 quelled the Satsuma rebellion. He commanded the successful Japanese forces in the Chinese war of 1894-95, and was prominent in the Russo-Japanese war of 1904; was president of the councils of war which formulated the plan of campaign.

Yang-tze-kiang (yang-tsē-kē-ang'), one of the two great rivers of China, is formed by two streams rising in Eastern Tibet, in lat. 26° 30′ N., lon. 102° E. After flowing east and then south it enters the Chinese province of Yunnan. Pursuing a very tortuous course, much of it through most fertile and densely-populated regions, it reaches the great city of Nanking, 200 miles from the sea, where it widens gradually into the vast estuary which connects it with the Yellow Sea. Its whole course, under various names, is 2900 miles, and the area of its basin is computed to be 548,000 square miles. It is connected by the Grand Canal with the Hoang-ho or Yellow River, and is navigable for vessels of considerable draught for 1200 miles from its mouth. By the Treaty of Tien-tsin the Lower Yang-tze was opened to European trade; and 700 miles from its mouth is the treaty-port of Hangkow, the great commercial city of Mid-China. The highest port on the river at present open to foreign trade is Ichang, 1000 miles from its mouth.

Yan'ina. See *Janina*.

Yankee (yan'kē), a cant name for Americans belonging to the New England States. During the American Revolution the name was applied by the British to all the insurgents; and during the Civil war it was the common designation of the Federal soldiers by the Confederates. In Britain the term is sometimes improperly applied generally to natives of the United States. The

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most common explanation of the term seems also the most plausible, namely, that it is a corrupt pronunciation of *English* or of French *Anglais* formerly current among the American Indians.

Yankee-Doodle, a famous air, now regarded as American and national. In reality the air is an old English one, called *Nankey Doodle*, and had some derisive reference to Cromwell. The really national air of the whole United States, however, is 'The Star-Spangled Banner,' which divides public favor as a patriotic song with 'America,' beginning,

'My country, 'tis of thee,
Sweet land of liberty,' etc.

Yankton (yank'tun), a city, county seat of Yankton Co., South Dakota, and up to 1883 the capital of Dakota Territory. It is on the N. bank of the Missouri River, 61 miles N. W. of Sioux City. It contains Yankton College and has flour mills, grain elevators, brewery, brick, tile and cement works, etc. Pop. 4000.

Yankton Indians, a tribe in North and South Dakota, numbering about 7000.

Yard, a British and American standard measure of length, equal to 3 feet or 36 inches, the foot in general being made practically the unit. As a cloth measure the yard is divided into 4 quarters = 16 nails. A square yard contains 9 square feet, and a cubic yard 27 cubic feet. See *Weights and Measures*.

Yard, in ships, a long cylindrical piece of timber, having a rounded taper toward each end, slung crosswise to a mast. All yards are either *square* or *lateen*, the former being suspended across the masts at right angles for spreading square sails, the latter obliquely. Yards have sheave-holes near their extremities for the sheets reeving through. Either end of a yard, or rather that part of it which is outside the sheave-hole, is called the *yard-arm*.

Yare (yär), a river of England, which, rising about the middle of Norfolk, flows east past Norwich, and after receiving the Waveney widens into the estuary of Breydon-water, is joined by the Bure, and enters the German Ocean 2½ miles below Great Yarmouth, after a course of about 30 miles.

Yarkand (yär-kănd'), the chief town in the principal oasis of Eastern Turkestan, is situated on the river Yarkand. It is enclosed by a thick mud wall, and its rich gardens are well watered by numerous canals. The inhabitants, chiefly Persians, are keen traders. Pop. estimated at from 75,000 to 100,000.—The river rises in the Karakorum Mountains, and helps to form the river Tarim, which enters Lob Nor.

Yarmouth (yär'muth), or, as it is more strictly called, GREAT YARMOUTH, an English seaport, important fishing station, and watering place, is in the county of Norfolk, 20 miles east of Norwich. It is situated on a long and narrow tongue of land running from north to southward between the German Ocean and the estuary of the Yare. The town is connected by a bridge with Little Yarmouth, or South Town, in Suffolk. The parish church of St. Nicholas, founded in 1101, and of late years completely restored, is one of the largest in the kingdom. Yarmouth has a naval lunatic asylum, the only one in the kingdom. It is the great seat of the English herring and mackerel fishery, and also furnishes large quantities of white-fish. The curing of herring as 'Yarmouth bloaters' is an important industry. The coast is dangerous, but Yarmouth Roads, between the shore and a range of sandbanks, offers a safe anchorage. Pop. (1911) 55,188.

Yarmouth, a seaport town of Nova Scotia, 205 miles S.W. of Halifax, and the chief shipbuilding place in the province. Pop. 6600.

Yarn, any textile fiber prepared for weaving into cloth. See *Thread*.

Yaroslaf. See *Jaroslav*.

Yarr, a well-known British and European plant, *Spergula arvensis*. See *Spurrey*.

Yarra-Yarra (yar'rà-yar'rà), the Australian river on which Melbourne, Victoria, is situated. Its length is about 100 miles. On account of falls it is not navigable above Melbourne. See *Melbourne*.

Yarrell (yar'el), WILLIAM, an eminent naturalist, was the son of a newspaper agent in London; born there in 1784; died in 1856. He assisted in and succeeded to his father's business. He contributed frequently to the *Transactions* of the Linnæan Society, of which he became a fellow, and to natural history periodicals. His two works, the *History of British Fishes* and the *History of British Birds*, are standard authorities.

Yarriba. See *Yoruba*.

Yarrow (yar'ō), a name given to a pungent plant, *Achillæa millefolium*, also known by the name *milfoil* (which see).

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Yarrow, a parish in Selkirkshire, Scotland, chiefly pastoral, celebrated for its poetical and historical associations. The river Yarrow, famous in song, issues from the foot of St. Mary's Loch, and, flowing 14½ miles eastward, falls into the Ettrick, 2 miles S. W. of Selkirk.

Yataghan (yat'a-gan; Turk. *yataghân*), a sort of dagger-like saber with double-curved blade, about 2 feet long, the handle without a cross-guard, much worn in Mohammedan countries.

Yates (yāts), EDMUND HODGSON, an English novelist, born in 1831; died in 1894. He wrote *Broken to Harness, Land at Last, Dr. Wainwright's Patient, The Impending Sword, Personal Reminiscences,* etc.

Yawl (yąl), a small ship's boat, usually rowed by four or six oars; a jolly-boat; also a sailing boat similar to a cutter, but having a small sail at the stern.

Yawning (yąwn'ing), an involuntary expansion of the mouth, a reflex muscular action, generally produced by weariness, tedium, or an inclination to sleep, sometimes by hunger, etc. When yawning is troublesome, it may be relieved by long, deep respiration, or drawing in the air at long intervals.

Yaws (yąz), a disease occurring in America, Africa, and the West Indies, and almost entirely confined to the African races. It is characterized by cutaneous tumors, numerous and successive, gradually increasing from specks to the size of a raspberry, one at length growing larger than the rest; core a fungous excrescence; fever slight, and probably irritative merely. It is infectious and contagious, and is produced by inoculation with *Treponema pertenius,* which may be carried by the common house fly. It is also called *frambœsia,* from the French *framboise,* a raspberry. It is treated by intramuscular or intravenous injections of dioxyamido-arsenobenzol, or '606,' a remedy brought forward by Dr. Ehrlich for syphilis, both diseases being caused by varieties of *Treponema.* Milk of goats thus treated is suggested for children affected with the disease.

Yazoo River (yaz'ō), a river of Mississippi, 200 miles long, navigable throughout its course, and joining the Mississippi River 5 miles above Vicksburg.

Yazoo, a city, capital of Yazoo Co., Mississippi, on the navigable Yazoo River, 45 miles N. N. W. of Jackson. It has cotton, oil and lumber interests. Pop. 6796.

Year (yēr), the period of time during which the earth makes one complete revolution in its orbit, or the period which elapses between the sun's leaving either equinoctial point, or either tropic, and his return to the same. This is the *tropical* or *solar* year, and the year in the strict and proper sense of the word. This period comprehends what are called the twelve calendar months, and is usually calculated to commence on January 1 and to end December 31. It is not quite uniform, but its mean length is about 365 days, 5 hours, 48 minutes and 51.6 seconds. In popular usage, however, the year consists of 365 days, and every fourth year of 366. See *Leap-year.*— *Anomalistic year.* See under *Anomaly.*— *Civil year,* the ordinary year of 365 days.— *Ecclesiastical year,* from Advent to Advent.— *Gregorian year, Julian year.* See *Calendar.*— *Lunar year,* a period consisting of 12 lunar months. The *lunar astronomical year* consists of 12 lunar synodical months, or 354 days, 8 hours, 48 minutes, 36 seconds. The *common lunar year* consists of 12 lunar civil months, or 354 days. The *embolismic* or *intercalary lunar year* consists of 13 lunar civil months, and contains 384 days.— *Sabbatical year.* See *Sabbath.*— *Sidereal year.* See *Sidereal Time.*

Yeast (yēst), the yellowish substance, having an acid reaction, produced during the vinous fermentation of saccharine fluids, rising to the surface, when the temperature of the fluid is high, in the form of a frothy, flocculent, viscid matter (*surface yeast*), and falling to the bottom (*sediment yeast*) when the temperature is low. The ordinary yeast of beer consists of an immense number of minute cells, which constitute a plant called the yeast-plant, which multiplies by budding off other cells, or sometimes by spores. Little is known regarding the genesis of the yeast-plant. Pasteur's researches seem to show that the yeast which forms in grape juice is derived chiefly from certain germs abounding about harvest-time on the grapes, and diffused throughout the atmosphere of breweries and wine-cellars, etc. Yeast is not only generally essential to the production of wine from grape and other fruit juices, and to the manufacture of beer, but it is also an agent in producing the fermentation whereby bread is rendered light, porous, and spongy and has superseded leaven. (See *Fermentation.*)— *German yeast* is prepared in various ways from common yeast collected, drained,

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and pressed till nearly dry. It can be so kept for several months, and is much used by bakers.—*Patent yeast* is yeast collected from a wort of malt and hop, and treated similarly to German yeast.—*Artificial yeast* is a dough of flour and a small quantity of common yeast made into small cakes and dried.

Yeats (yāts), WILLIAM BUTLER, an Irish poet, born at Dublin, in 1865. He wrote *The Wanderings of Oisin and Other Poems, Countess Cathleen, Shadowy Waters*, etc., and various plays of verse since published as *Plays for the Irish Theater* (1912). He was one of the leaders of the Celtic Renaissance, and has written some prose works including *The Celtic Twilight* and *Sygne and the Ireland of His Time*.

Yeddo. See *Tokio*.

Yeisk. See *Ieisk*.

Yeletz. See *Ieletz*.

Yell (yel), the second largest of the Shetland Islands, separated from the mainland by Yell Sound, and 25 miles N. of Lerwick. It is about 17½ miles in length, and from half a mile to 6 miles in breadth. The surface is chiefly moorland, and fishing is the leading employment. Pop. 2579.

Yellow (yel'ō), one of the prismatic colors; the color of that part of the solar spectrum situated between the orange and the green; a bright golden color, the type of which may be found in the field buttercup, which is a pure yellow. United with blue it yields *green;* with red it produces *orange*. See *Color* and *Spectrum*.

Yellow-berries. See *French Berries*.

Yellow-bird, a small singing bird common in the United States, the *Fringilla* or *Chrysometris tristis*. The summer dress of the male is of a lemon yellow, with the wings, tail, and fore part of the head black. When caged the song of this bird greatly resembles that of the canary.

Yellow Fever, popularly known as 'yellow jack,' an infectious disease of tropical and semi-tropical America and the western tropical coast of Africa. It is caused by the injection of the yellow fever bacteria through the bite of the *Stegomyia fasciata* mosquito, which was proved by researches made in Havana, Cuba, in 1899, by Drs. Walter Reed, J. Carroll and A. Agramonte, of the United States Marine Hospital Service. The symptoms begin in from one to six days after the mosquito bite is inflicted. One attack usually confers lifelong immunity. There are three stages: 1. The febrile stage, beginning with malaise, headache, irritable stomach, chills, high fever; pains in head, back and limbs; scanty urine; a peculiar odor. Slight jaundice occurs, resembling the appearance just prior to the eruptive stage of measles. The white of the eye is colored yellow. The coloring deepens for several days, and may become quite dusky. Albumin appears in the urine on the third day. 2. About the third or fourth day the fever drops to 100° or 99° F. and other symptoms improve. A crisis may then terminate the disease. 3. In the third stage the previous symptoms may reappear in worse form than before. A characteristic is an abnormally slow pulse with a fever, where the pulse rate may decrease while the fever grows higher. The other symptoms are: complete jaundice, black vomit, hæmorrhages from mucous membranes, feeble pulse, cold surface, irregular respiration. Prevention of the spread of the disease is accomplished by completely screening the patient so that no mosquito can bite him to carry the germs elsewhere. By this method epidemics of the disease can be prevented and it may in time be eradicated. It is treated by calomel for the bowels, sodium bicarbonate to reduce excessive urinary acidity, no food for three or four days because of the condition of the stomach, febrifuges, heart stimulants and other treatment.

Yellow-hammer, YELLOW-AMMER, a passerine bird of the genus *Emberiza*, the *E. citrinella;* called also *yellow-bunting*. The head, cheeks, front of the neck, belly, and lower tail-coverts are of a bright yellow. The upper surface is partly yellow, but chiefly brown, the feathers on the top of the back being blackish in the middle, and the tail feathers are also blackish. The yellow-hammer occurs throughout Europe.

Yellow Pine, a North American tree, *Pinus mitis* or *variabilis*. The wood is used largely for domestic purposes in the United States. In Canada and Nova Scotia the name is given to *P. resinosa*, and it is also applied to *P. australis*.

Yellow River. See *Hoang-ho*.

Yellows, an inflammation of the liver, or a kind of jaundice which affects horses, cattle and sheep, causing yellowness of the eyes. The same name is given to a disease which affects the peach tree.

Yellow Sea (Chinese, *Whang-hai*), an arm of the Pacific

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THE YELLOWSTONE
View of the Grand Cañon and Inspiration Point from Artist's Point.

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Ocean, on the northeast coast of China; length, about 620 miles; greatest breadth, about 400 miles. It is very shallow, and obtains its name from the lemon-yellow color of its water near the land, caused by mud suspended in the water from the inflow of the rivers Hoang-ho and Yang-tse-kiang.

Yellowstone National Park, a region of the state of Wyoming, occupying its northwest corner with slight extensions into Montana and Idaho; of remarkable natural beauty and unique for the number and diversity of its geysers and hot springs. It was in 1872 withdrawn from settlement by the United States government to become a park or tract for the recreation of the people. It was originally about 62 miles in length (from N. to S.), and 54 in width, with an area of 3350 sq. miles, but in 1882 a forest preserve of over 2000 square miles was added in the E. and S., making the total area a little over 5500 sq. miles. It is readily accessible by a branch of the Northern Pacific Railway. Its surface is mainly an undulating plain, diversified, however, by great mountain ranges, one of which, the Absaraka, a range separating the waters of the Yellowstone river (which see) from those of the Big Horn, contains some of the grandest scenery in the United States. The whole region exhibits an endless variety of wild volcanic scenery — hot springs, mud volcanoes, geysers, cañons, waterfalls, etc. The geysers are more remarkable than those of Iceland, and the Grand Geyser in Firehole Basin is the most magnificent natural fountain in the world. The Yellowstone Lake, one of many, is a magnificent sheet of water, with an area of 150 sq. miles, and an elevation of 7440 feet. The falls of the Yellowstone are of striking beauty. The Mammoth Hot Springs also are notable, from their beautiful terraces and basins of exquisitely colored calcareous deposits. A large part of the park is covered with forest. Stringent legislation protects the game, with the result that elk, deer, antelope and bear, have taken refuge in it and have rapidly increased in numbers.

Yellowstone River, a river of the Western United States, which rises in the Rocky Mountains, about lat. 44° N. and lon. 110° W. After a course of about 25 miles its passes through the lake of the same name, and runs northward through the Yellowstone National Park. Soon after issuing from the lake the river makes at intervals a series of falls (the last being 300 feet high), and traverses cañons, one of which, the Great Cañon, is 30 miles in length, its steep sides being colored in bright hues and shaped in a great variety of fantastic forms. Running in a northeasterly direction the river ultimately joins the Missouri about lat. 48° N., after a course of some 1100 miles. Steamers can ascend it for 300 miles to the mouth of the Big Horn, which is its largest affluent.

Yellow-throat, a small North American singing bird (*Sylvia Marilandica*).

Yemen (yem'en), a division of Arabia, occupying the southwest angle of the peninsula, and known as Arabia Felix. Some portions of it are very fertile. Among its principal products is coffee, to a specially prized kind of which Mocha, one of its seaports, has given a name everywhere known. Estimated area, 70,000 square miles; estimated population, about 750,000. (See *Arabia.*) The chief potentate is the Imám of Sana, a tributary of Turkey.

Yen, a Japanese money of account, equivalent to $1.04.

Yenikalé (yen-ik'a-lā), STRAIT OF, connecting the Black Sea with the Sea of Azof, is about 20 miles long, and in some parts only 2 miles broad and 2 fathoms deep.

Yenisei (yen'i-sī), a great river of Asia, rises in Mongolia, flows northward through Siberia, and after a course of about 2500 miles enters the bay of the same name in the Arctic Ocean.

Yeniseisk (yen-e-sā'isk), a large province of Eastern Siberia, extending from the Chinese frontier to the Arctic Ocean; area, 986,908 sq. miles. It contains rich auriferous deposits. Pop. 657,900.— The capital, of the same name, is the chief entrepôt for the gold mines of the province and the Siberian fur-trade. Pop. 11,739.

Yeomanry (yō'man-ri), a volunteer cavalry force originally embodied in Britain during the wars of the French revolution. They must furnish their own horses, but have an allowance for clothing; the government also supplying arms and ammunition. Unlike the ordinary volunteer force, the yeomanry cavalry may be called out to aid the civil powers in addition to their being liable for service on invasion of the country by a foreign enemy.

Yeomen of the Guard. See *Beef-eaters.*

Yeovil (yō'vil), a municipal borough of England, in Somerset, on the river Yeo or Ivel, 40 miles south of Bristol. It has a fine cruciform church dating from the fifteenth century, and is

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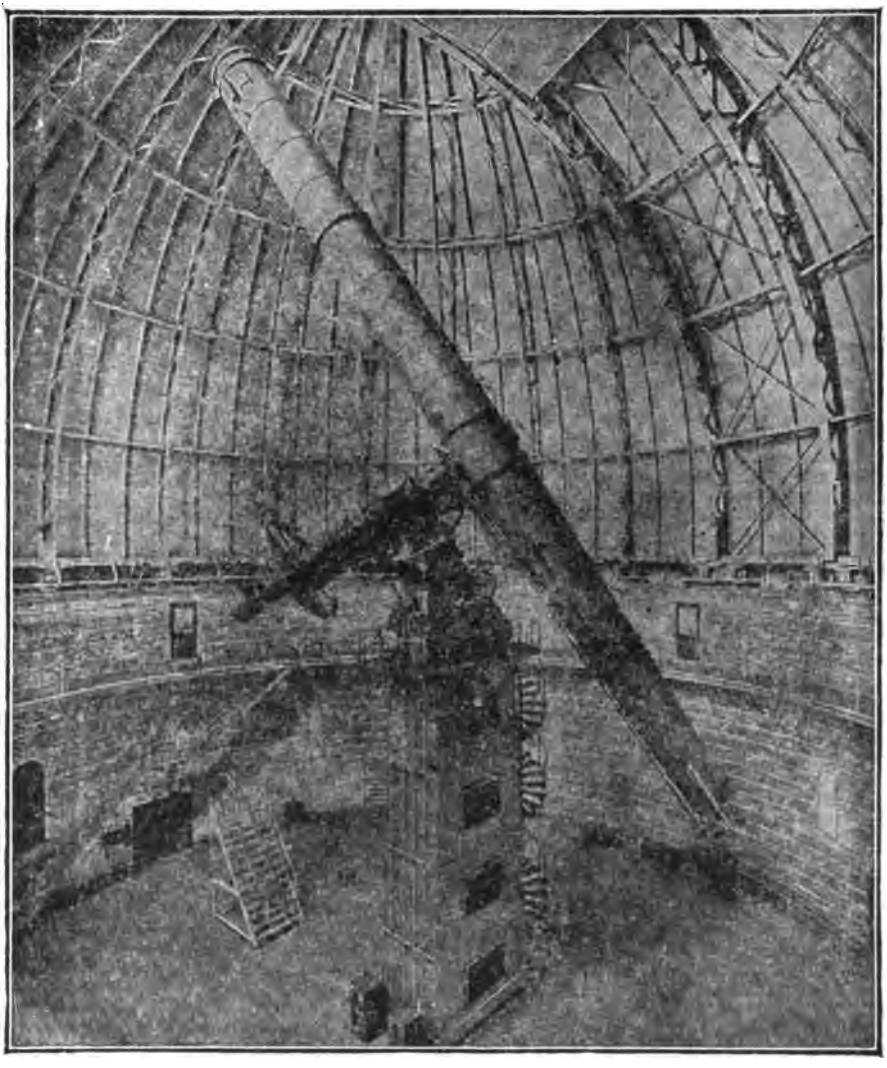

THE GREAT 40-INCH EQUATORIAL TELESCOPE, YERKES OBSERVATORY

All perfections possible seem to be combined in this instrument, which with its moving dome cost some $170,000. The moving floor is raised by electrical means, the clock rewinds itself, and yet other motors direct the telescope to the desired place. The observatory is at Williams Bay, Wisconsin.

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noted for its manufacture of gloves. Pop. 13,760.

Yerkes Observatory, an institution donated by Charles T. Yerkes, a capitalist of Chicago, to Chicago University. It is located at Williams Bay, Wisconsin, 75 miles above Chicago, and is furnished with a 40-inch lens telescope, one of the largest in the world. It is thoroughly equipped with other astronomical instruments.

Yesso (yez'ō), YEZO, or JESSO (officially called Hokkaido), the most northerly of the larger Japan islands, has an area of about 36,300 sq. miles, and a pop. (1904) of 843,717, including about 18,000 Ainos, a docile aboriginal race. The island is mountainous and volcanic, and is rich in minerals, including coal, gold, and silver. Matsmai and Hakodadi (which see) are the chief towns.

Yew (ū), an evergreen tree of the genus *Taxus*, nat. order Taxaceæ. The common yew is *T. baccāta*, indigenous in most parts of Europe. It is a handsome tree, growing to a height of from 30 to 40 feet, with numerous spreading branches, forming a dense head of foliage. Its trunk is thick, and has been known to attain a circumference of 56 feet. Its fruit is a red berry with green seeds. It used to be frequently planted in churchyards, and its tough elastic wood was extensively used in the manufacture of bows. In our own days, on account of the durability of the timber, and of its hard, compact, close grain, it is much used by cabinet-makers and turners. There are several varieties of it, the Irish yew, which has a more upright growth than the common yew, being esteemed the finest. The American yew (*T. baccata Canadensis*) is a low prostrate shrub, never forming an erect trunk. It is found in Canada and the more northern of the United States, and is commonly called *ground-hemlock*.

Yew (*Taxus baccāta*).

Yezd (yezd), a city of Persia, province of Farsistan, in an oasis in a sandy plain 190 miles southeast of Ispahan. It is noted for its velvet and other silk manufactures, and contains about 4000 fire worshipers. Pop. estimated at 50,000.

Ygdrasil, YGGDRASILL (ig'dra-sil), in Scandinavian mythology, the giant ash-tree spread over the whole world, the branches of which reach above the heavens, the roots of which reach down to the under world. Ygdrasil typifies existence.

Yiddish (yid'ish), JUDISCH or JUDEO-GERMAN, jargon spoken by the Jews in Russia and Central Europe and carried by immigrants to America. It is a High German with a large admixture of Hebrew and other languages. It is spoken by over six million people and is the medium of a considerable literature, some of it dating from the 16th century.

Yoga (yō'ga; union), in Hindu philology, one of the six Darsanas or schools of Brahmanical philosophy, that of Patanjali, the essence of which is meditation. Theoretically at least its devotees can acquire entire command over elementary matter by certain ascetic practices, such as long-continued suppression of the breath, and by endeavoring to unite themselves with the vital spirit which pervades all nature. When the mystical union is effected, the disciple (Yogi) can, according to the belief, traverse all space, become invisible, know the past, present and future.

Yokohama (yō-kō-hä'ma), the most important of the Japanese ports from its proximity to Tokio, the capital of the empire, with which it is connected by a railway 18 miles in length. The foreign settlement consists of well-constructed streets with business establishments. The harbor, a part of the bay of Tokio, is good and commodious. Steamers from San Francisco, Vancouver Island, etc., call regularly. The population has grown rapidly within recent years, increasing from 70,019 in 1884 to 394,303 in 1909.

Yonkers (yong'kerz), a city of Westchester county, New York, on the east bank of the Hudson River, adjoining the northern line of New York City. It is both a residential and manufacturing city, its industries including large carpet, elevator and hat manufactures, also sugar refineries, sash, door and metal-foil factories. The first settlement here was made about 1650. Pop. 88,000.

Yonne (yon), a department of Central France, traversed by the river Yonne, which is navigable throughout it. The soil is very fertile, producing large wheat crops, and the vines yield the finest red wines of Lower Burgundy, and the finest of white wines, the well-known Chablis. Auxerre is the capital. Area 2880 sq. miles. Pop. (1910) 332,277.

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York (yōrk), or YORKSHIRE, the largest county of England, faces the North Sea on the N. E. and extends from the Tees river on the N. to the estuary of the Humber in the S.; area 6067 sq. miles. It is divided into the North, South, and West Ridings, each riding having a separate lord-lieutenant. The surface is much diversified, there being a large central valley with a mountainous district in the N. E. and in the E. an elevated chalky district called the Weald. The county contains some of the most fertile tracts in the kingdom, while there are areas of barren moor. The central valley is drained chiefly by the Ouse and its tributaries. The West Riding contains some of the richest coal mines in the Kingdom and there are large deposits of iron in the N. There are a number of large manufacturing centers, including Leeds, Sheffield, Bradford, Huddersfield and others. Hull and York are other notable cities, York being the capital. Pop. (1911) 3,980,451.

York (British, *Caer Effroc*, or *Ebroc*; Latin, *Eborăcum*), a cathedral city and archbishop's see, the capital of Yorkshire, England, 188 miles north of London by rail, is situated at the confluence of the Foss and the Ouse. The city proper, embracing a circuit of nearly 3 miles, was inclosed by walls, restored by Edward I, of which the portions still remaining have been converted into promenades, commanding a prospect of the surrounding country. There are many quaint, old-fashioned houses in the narrow streets of its older portion. The great object of attraction, however, is the minster or cathedral, the finest in England, which dates from the seventh century, but did not begin to assume its present form till the twelfth century, and was not completed till 1472. It is built in the form of a Latin cross with choir, aisles, transepts, a central tower and two western towers; extreme length, 524 feet; breadth, 250; height of central tower, 213 feet. (See cut at *Decorated Style*.) York was the capital of Roman Britain. It was made an archiepiscopal see by Edwin of Northumbria in 624. It still ranks second theologically and politically among English cities, its archbishop having the title of Primate of England (see *Archbishop*), and its chief magistrate takes the title of lord-mayor. It was incorporated by Henry I, and the city boundaries were extended in 1884. The trade is local, and the industries unimportant. Pop. 82,297.

York, a city, capital of York Co., Nebraska, on a branch of the Big Blue River, 50 miles W. of Lincoln. It is in a farming and stock-raising region, and manufactures flour and foundry products. Pop. 6235.

York, a city, capital of York Co., Pennsylvania, lies on Codorus Creek, a branch of the Susquehanna, 28 miles S. S. E. of Harrisburg. It is in a rich agricultural region and has a number of educational and charitable institutions. The industries are varied, including bridge and chain works, paper and pulp mills, foundries and machine shops, traction engines, water-wheels, farm implements, and various others. The Continental Congress met at this place in 1777-78 while Philadelphia was occupied by the British army. Pop. 55,000.

York, HOUSE OF, an English royal house, the rival of that of Lancaster. The House of York was united to the House of Lancaster when Henry VII married the eldest daughter of Edward IV. The emblem of the Yorkists was a white rose. See *England* (*History*).

York Peninsula, in Queensland, Australia, the region lying on the east side of the Gulf of Carpentaria, and terminating at its north end in Cape York, separated from New Guinea by Torres Strait.

Yorktown (yōrk'toun), a village, capital of York Co., Virginia, on the right bank of York river, nearly 10 miles from its mouth and 36 miles N. N. W. of Norfolk. It was the scene of the surrender of Lord Cornwallis to General Washington, October 19, 1781. The surrender is commemorated by a monument. In the Civil war it was fortified by the Confederates, who, having been besieged by General McClellan, evacuated it May 4, 1862. Its population now numbers little over 100.

Yoruba (yō'rō-bä), a country of West Africa, north of the Bight of Benin. It is peopled by a number of confederated tribes, and is now attached to the colony and protectorate of Lagos. Much of the country is fertile and well cultivated, and the inhabitants have made great progress in the industrial arts. They are chiefly pagans, but Mohammedanism has made way among them. Protestant and Roman Catholic missions have long been at work among them. Ibadan is the largest town.

Yosemite Valley (yō-sem'i-te), one of the greatest natural wonders of North America, is in Mariposa county, California, about 180 miles E. by S. of San Francisco and midway between the eastern and western bases of the Sierra Nevada. It is a narrow valley at an elevation of 3850 feet

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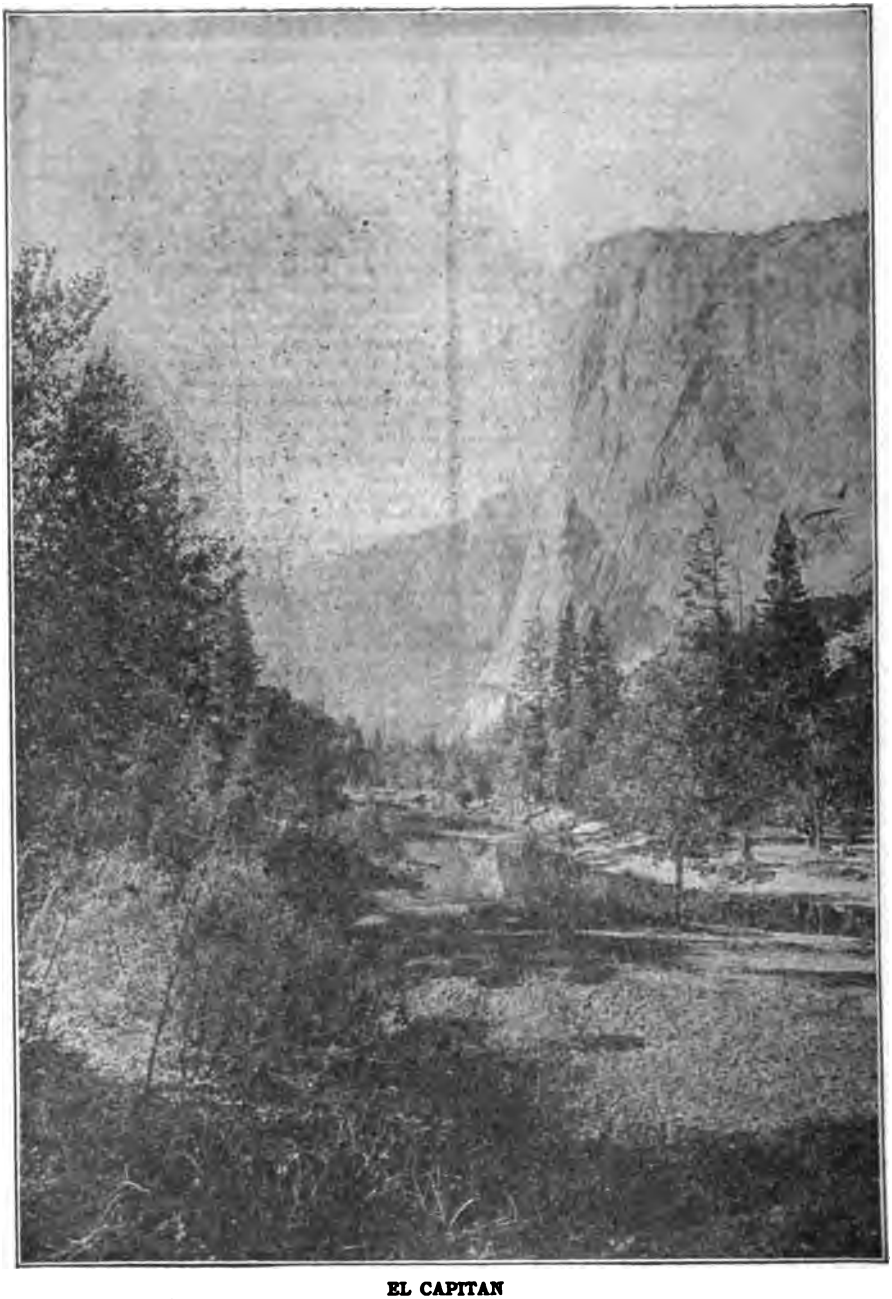

EL CAPITAN
View in the Yosemite Valley, California.

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above the sea, and is itself nearly level, about 6 miles in length, and varying in width from ½ mile to a mile. On each side rise enormous domes and almost vertical cliffs of granite, one of them, called the Half Dome, being 4737 feet higher than the river Merced at its base, while there are various others equally notable in aspect. Numerous waterfalls and cascades descend from prodigious heights, the chief being the Yosemite Falls, which drops nearly half a mile. The Bridal Veil Fall is also very picturesque. This valley forms part of the California Yosemite State Park, which is included in the larger Yosemite National Park.

Yoshihito (yō-shi-hē'tō), emperor or mikado of Japan, the son of Mutsuhito, born in 1879, proclaimed Crown Prince in 1889. He received a liberal education, and though extremely delicate as a child grew into robust manhood. On the death of Mutsuhito in 1912, Yoshihito succeeded to the throne.

Youghal (yŏ'al or yal), a seaport of Ireland, on the estuary of the Blackwater, county Cork, 28 miles east of Cork. It has manufactures of earthenware and bricks. Pop. 5393.

Young (yung), ARTHUR, a distinguished agricultural writer, born in 1741; died in 1820. He became a farmer, and made a series of agricultural tours in England, Ireland, and France, publishing accounts of them, and in 1793 he was appointed secretary to the newly-constituted Board of Agriculture. Of his many writings his *Travels in France*, published in 1792, is the most interesting.

Young, BRIGHAM, president of the Mormon Church, was born in Vermont in 1801; died in 1877. In 1831 he became a Mormon, and an active preacher of the Mormon doctrine. He was one of the twelve founders of Nauvoo, and after the murder of the prophet, Joseph Smith, and the flight of the Mormons from Nauvoo, Young became their leader on their long journey westward, was elected their president on their settling in Utah, and when this was made a territory he was appointed its governor by President Polk. In 1852 he announced that polygamy had been commanded in a special revelation to Joseph Smith, and it was accepted generally by the Mormons of Utah. Young was a man of great practical ability. Utah flourished under his rule, and he long withstood successfully the efforts of the United States government to establish its authority there.

Young, CHARLES AUGUSTUS, astronomer, born at Hanover, New Hampshire, Dec. 15, 1834; was graduated at Dartmouth College in 1853; was a captain in the Civil war, and afterwards held several professorships, becoming professor of astronomy at Princeton College in 1877. He made very important spectroscopic studies and discoveries in solar physics and chemistry. His principal work was *The Sun*. He died January 4, 1908.

Young, EDWARD, an English poet, was the son of a dean of Salisbury, and born in 1683. He was educated at Winchester and Oxford, and obtained in 1708 a law fellowship at All Souls. Patronized and pensioned by the profligate Duke of Wharton, he wrote some poems and a couple of plays, one of which, *The Revenge*, long kept possession of the stage. His first great literary success was his production of a series of satires, issued collectively in 1728 as *The Love of Fame, the Universal Passion*. In 1728 he took orders, was made a royal chaplain and rector of Welwyn, Herts, in 1730. Between 1742 and 1744 appeared the work by which chiefly he is remembered, the gloomy but striking *Night Thoughts*. He died in 1765.

Young, ELLA FLAGG, an American educator, born in Buffalo, January 15, 1845; was educated at the Chicago High School and Chicago Normal School, and received the degree of Doctor of Philosophy from the University of Chicago in 1900. She began teaching in 1862; was district superintendent of schools in Chicago, 1887–99; professor of education in the University of Chicago, 1899–1905; principal of the Chicago Normal School, 1905–09; superintendent of public schools of Chicago since 1909. She is the author of a number of works.

Young, JOHN RUSSELL, journalist, born at Downingtown, Pennsylvania, in 1841; died in 1899. He was a war correspondent of the New York *Tribune* in the Civil war; established the *Morning Post* in Philadelphia and the *Standard* in New York; was European correspondent of the *Herald;* went round the world with General Grant; was appointed minister to China; and in 1897 was made librarian of Congress.

Young, SAMUEL BALDWIN MARKS, an American soldier, born in Pittsburgh, Pa., 1840; served in Civil and Spanish-American wars; lieutenant-general, 1903.

Young, THOMAS, scientist, was born of a Quaker family at Milverton, in Somersetshire, England, in 1773. He qualified himself for the medical profession, but a fortune left him made him rather languid in his practice as a physician in London. In 1802 he became the colleague of Davy as pro-

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fessor of natural philosophy at the Royal Institution, having previously made the discovery of the interference of light, the result of researches which, completed by Fresnel, secured the triumph of the undulatory theory. In 1807 appeared his admirable *Lectures on Natural Philosophy*. In 1818 he was appointed secretary to the Board of Longitude, with the charge of supervising the *Nautical Almanack*. Young preceded Champollion in the discovery of the alphabetic character of certain of the Egyptian hieroglyphs. He was a man of universal accomplishments, adding to his scientific and mathematical attainments a knowledge of the classical and the principal modern and oriental languages. He died in 1829.

Young Men's Christian Associations. Among the first of these was that founded in London in 1844 by George Williams. The movement extended, and became one not only for the religious but for the general culture and social wellbeing of young men engaged in business. These associations became widely extended, there being in 1916 in the United States alone 700,000 members, with buildings and property valued at $90,000,000. The European war opened a new field of work for them, and large sums of money were contributed to be used in their special line of activity for soldiers in camp and field.

Youngstown (yungz'toun), a city, capital of Mahoning Co., Ohio, on the Mahoning River, 66 miles southeast of Cleveland, in the vicinity of iron ore and coal beds. It contains a Federal building, various homes and hospitals, an opera house, library, etc. It is an important iron manufacturing town, having many large mills and foundries, also manufactures of lumber, cars, roofing materials, powder, motor cars, etc. Pop. 79,066.

Young Women's Christian Associations, on the same basis as the young men's, were founded in 1857 by the Dowager-Lady Kinnaird, and now exist in various cities of Britain and America. The work of the association among women is fourfold: physical, social, intellectual, and spiritual.

Ypres (ē-pr; Flemish, *Yperen*), Belgium, a town in the province of West Flanders, in a plain, on both sides of the Yperlee. 28 miles S. S. W. of Bruges, 53 miles by rail. It was almost entirely destroyed by the successive bombardments to which it was subjected in the European war. The first battle of Ypres took place in October, 1914, when Britain's small professional army with great bravery stopped the German forces in their march on the channel ports and drove them out of the town, which had first been occupied by the enemy on October 3. In the second battle, in the spring of 1915, the Canadians, who had taken the heights before the town, were compelled to retire into Ypres. It was in this battle that the Germans first introduced poison gas. During 1916 the Germans, from their positions on the heights, poured a steady stream of projectiles into the old town. Hardly a building was left standing, and even the beautiful Cloth Hall—a glorious relic of the 13th and 14th centuries, built in the form of an irregular trapesium surmounted by a square tower or belfry—was reduced to a heap of ruins.

In 1917 the third battle of Ypres was fought, with the British and Canadians on the offensive. The Germans were driven back and the famous Passchendaele Ridge and other important heights were gained by the Allied troops. The Canadians, under General Sir Arthur Currie, were given the honor of leading the assault, and gained a brilliant victory. The town of Ypres was full of memories for every Canadian, memories of great sacrifice and of many comrades laid to rest. The trenches which they took over on the ridge were the same trenches where, in the spring of 1915, the Germans had attacked them with poison gas. High officers who led them had played their part in lower ranks in the previous fight. It was of this third battle that Sir Douglas Haig, in his message to General Currie, said: 'I desire to congratulate you personally on the complete and important success with which your command of the Canadian Corps has been inaugurated. The two divisions you employed totally defeated four German divisions, whose losses are reliably estimated at more than double those suffered by the Canadian troops. The skill, bravery, and determination shown in the attack and in maintaining the positions won against repeated heavy counter attacks were in all respects admirable.'

The tide of battle surged back in 1918 in the desperate and reckless attempt of the Germans to reach Calais. The British forces relinquished the heights, but held fast at Ypres, as the French had done at Verdun and the Marne. (See *European War.*) In peace times the principal trade of the town was in cotton and laces. Jansen was bishop of Ypres and is buried in the crypt of the now ruined cathedral of St. Martin. It was formerly one of the most important manufacturing towns of Flanders, and in the

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14th century had 200,000 inhabitants and employed 4000 looms. The population in 1913 was 17,000.

Ypsilanti (ip-si-lan'ti), a city of Washtenaw county, Michigan, on the Huron River, 29 miles w. by s. of Detroit. It is the seat of the Michigan State Normal School, and has manufactures of paper, cement, agricultural implements, veneers, flour, etc. Pop. 6230.

Ypsilanti, a distinguished Greek family prominent in the Greek movement for independence. DEMETRIUS was born in 1793; died in 1832. He distinguished himself so highly in the revolution of 1821 as to be made president of the Greek legislative council after the liberation from the Ottoman yoke.

Ysaye (ē-zä'ē), EUGENE, a Belgian violinist, born at Liège in 1858; began to tour in 1878; and first visited the United States in 1894. He is justly regarded as one of the greatest living exponents of classical and virtuosic violin music. He was violin professor at the Brussels Conservatoire from 1886 to 1898 and was manager and conductor of the orchestral concerts.

Yssel, or IJSSEL (both ī'sl), a river of the Netherlands, which leaves the Rhine near Arnhem, and receiving the Old Yssel from Rhenish Prussia, enters the Zuyder Zee after a course of 80 miles.

Ysselmonde, IJSSELMONDE (ī'sl-mon-dē), an island of the Netherlands opposite the mouth of the Yssel.

Ystad (ü'ståd), a seaport town of South Sweden, on the Baltic, 36 miles southeast of Malmö. It has a safe and spacious harbor, and among its industries is shipbuilding. Pop. 9862.

Ystradyfodwg, or RHONDDA, a township of South Wales, in Glamorganshire, comprising several villages, the inhabitants of which are chiefly engaged in the collieries. Pop. 152,798.

Yttria (it'ri-a), the protoxide of yttrium, a white powder, insoluble in water, but soluble in some acids. When ignited it glows with a pure white light.

Yttrium (it'ri-um), an earth metal, one of the elements, the basis of yttria; symbol Y, atomic weight 93. Its texture is scaly, and its color grayish-black.

Yuan Shi-kai, president of China, was resident commissioner in Korea before the Japan-Chinese war, and after that war was made vice-president of the army board, with the control of an army corps. He now became the leading power in modernizing the Chinese army, and by 1904 had a corps of many thousands of well-drilled and well-armed men. Also, as viceroy of Chili province, he was instrumental in introducing the modern system of education into the empire. At an earlier date he had become aware of the plans of the young emperor and his reformer associates to introduce radical reforms and seize the reins of power long held by the empress dowager. He informed her of her danger, in consequence of which she, with the support of the conservatives, made a palace prisoner of Kwang Seu, the emperor. Yuan gained high favor with the empress dowager by this act, but after her death, in 1908, Prince Ohun, the regent, dismissed him from his post as Grand Councilor. A hasty flight probably saved his life. After the beginning of the revolution of 1911 Yuan was recalled by the regent and made premier, with dictatorial power, being asked to use every effort to save the Manchu dynasty. He showed great ability in dealing with the difficult situation, arranged an armistice with the revolutionists, but found it impossible to save the empire. The leaders of the revolutionary movement insisted on the dethronement of the child emperor and the establishment of a republic. Yuan was obliged to yield to this demand, and on the abdication of the imperial family in 1912 and the resignation of Sun Yet Sen, the provisional president, he accepted the presidency. An attempt by him to restore the empire at the close of 1915 failed and he continued to hold the presidency until his death in June, 1916.

Yucatan (yö-kȧ-tȧn'), a peninsula forming the southeastern extremity of Mexico. Before its conquest by the Spaniards it was the seat of a flourishing civilization. It is now for the most part a sparsely cultivated region, whose forests yield excellent timber, cabinet-woods and dye-woods, and which has recently been productive of great quantities of sisal or so called Yucatan hemp. Yucatan is rich in architectural remains of its ancient inhabitants, temples, pyramids, etc., the work of the civilized Mayas. The most imposing of these ruins are those at Uxmal, Labwa, Loltun, and Chichen-itza. Five-sixths of the inhabitants are Indians, preserving the speech of their ancestors, whom the Spaniards dispossessed. In 1861 the peninsula, which since 1824 had formed one state in the Mexican Confederation, was divided into two: Yucatan, area 29,560 square miles, pop. 314,087, capital Merida; and Campeachy, area

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18,100 square miles, pop. 84,281, capital Campeachy.

Yucca (yuk'ȧ), a genus of American plants, nat. order Liliaceæ. The species are handsome plants, with white flowers, extremely elegant, but destitute of odor. *Y. gloriosa*, or common Adam's needle, is much prized on account of its panicle of elegant flowers, which attain a height of 10 or 12 feet. It yields a fiber well adapted for paper-making *Y. filamentosa*, the silk grass, which has panicles of pendulous, cream-colored flowers, is also acclimatised as a garden plant, blossoming in the autumn.

Yucca gloriosa.

Yukon (yö'kon), one of the largest rivers of America, rises in Canada about lat. 57° 45′ N., lon. 130° 45′ W., pursues a generally westward course, of which the length is estimated at 2200 miles, the greater portion in Alaska, and enters the Pacific Ocean by several mouths. For three-fourths of its course it is navigable by steamers, and is a channel of supply for the gold regions of the Klondike and parts of interior Alaska.

Yukon, a territory of northwest Canada, north of British Columbia, adjoining the territory of Alaska; area 207,076 sq. miles; area lake surface 415,280 acres, population in 1901, 27,219; in 1911, 8512. It lies in the basin of the Yukon River and is largely mountainous. It is traversed by the Lewis, Pelly, White, Stewart and Klondike rivers. There are 142 miles of railways. The gold of Klondike valley gives the territory its chief importance, though copper and coal are also mined. The gold produced from 1897 to 1914 amounted to $175,000,000. The territory is governed by commissioner and ten members of a Legislative Council. Dawson City is its chief city of importance; Whitehouse ranks next, situated as it is at the head of navigation on the Yukon River.

Yule (yül), the old English and Scandinavian name for Christmas, still to some extent in use, as in the term *yule-log*.

Yunnan (yun-nan'), the most southwesterly province of China, is bounded on the south by Annam, Siam, and Burmah, and on the west by Burmah. It is extremely rich in minerals, especially iron and copper, containing also many varieties of precious stones. At least a third of the cultivated land is said to be under the poppy. The inhabitants are for the most part Chinese; but there is a large number of non-Chinese Mohammedans (called by the Burmese Panthays). In 1869 the Mohammedans rose in rebellion against the Chinese government, and succeeded in establishing an independent government, but it lasted only three or four years. By the convention of Chefoo, in 1876, the establishment of commercial relations between British subjects and Yunnan was conceded by the Chinese government. Estimated area, 146,500 square miles; estimated pop. 12,000,000.—YUNNAN, the capital, is situated in the southeast of the province, and is a busy and prosperous town. Pop. (1907) 45,000.

Yvetot (ēv-tō), a town of France, 24 miles northwest of Rouen. From the fifteenth to the middle of the sixteenth century the lords of Yvetot bore the title of *king*, and their lands were exempt from service to the French crown; hence Béranger's famous song, *Le roi d'Yvetot*. Pop. (1906) 6214.

Yvon (ē-von), ADOLPHE, painter, was born at Escheviller, France, in 1817. He studied art with Paul Delaroche. In 1843 he visited Russia, and from there sent pictures to the Salons of 1847-48. He was successful in portraits and battle scenes. He received the grand medal of honor in 1857; also in 1867. His pictures are full of movement, and the painting sober and straightforward, free from affectation. Died September 11, 1893.

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Z

Z, the last letter of the English alphabet, is a sibilant consonant, and is merely a vocal or sonant *S*, having precisely the same sound that *s* has in *wise, ease, please*, etc. (See *S*.) The words in modern English, which begin with *z* are all derived from other languages, mostly from the Greek. When not initial, however, we often find it representing an older *s* in genuine English words, as in *blaze, freeze, gaze, graze*, etc.

Zaandam (zän-däm'), or SAARDAM, a town in the province of North Holland, 3 miles northwest of Amsterdam. It is noted chiefly as the place where in 1697 Peter the Great worked for a short time as a ship carpenter. Pop. (1913) 26,172.

Zabern (tsä'bèrn); French, *Saverne*), a town of Germany, in Alsace, at the foot of the Vosges Mountains, and on the Rhine and Marne Canal. Pop. 8499.

Zacatecas (să-kâ-tā'kâs), a state of Mexico, belonging to the central tableland, and bounded by the states of Aguas-Calientes, Jalisco, Durango, Cohahuila, Nuevo-Leon, and San Luis Potosi. It is very rich in gold and silver, which are extensively mined. Area, 24,757 square miles. Pop. 462,190. —ZACATECAS, the capital, 340 miles northwest of Mexico, is the center of one of the oldest and most productive silver-mining districts in the republic. Pop. (1910) 25,900.

Zacaton (zak'a-ton), a grass of wide growth in America, which is recommended by the U. S. Department of Agriculture for the manufacture of paper, to which it seems well adapted.

Zaffre (zaf'er), an impure oxide of cobalt, used in painting.

Zagazig (zä-gä-zēg'), the capital of the Egyptian province of Sharkiyeh, at the junction of the railways from Cairo, Suez, Alexandria, and Damietta, and on the fresh-water canal, 6 miles from Tel-el-Kebir, the scene of Lord Wolseley's victory over Arabi, September, 1882. Pop. 34,09[illegible]

Zaire. See *Congo*.

Zambesi (zam-bā'zē), the most important river in Southeastern Africa, and the largest flowing into the Indian Ocean, has its source in several streams uniting in the far interior. It flows first southeast and then northeast, then curves again to the southeast, and reaches the Indian Ocean by several mouths in the Mozambique Channel opposite Madagascar. The delta of the Zambesi covers an area of about 25,000 square miles, and commences about 90 miles from the coast, a little below the confluence of the main stream with the Shiré. The course of the whole river is about 1400 miles, and it drains an area of 600,000 square miles. Its course as a whole is through fertile valleys and wooded plains; but the navigation is interrupted by rapids and cataracts, among the latter being the Victoria Falls, which are among the grandest in the world. The valley of the Zambesi is capable of immense development in the way of trade. The Portuguese government have long exercised sway for three hundred miles from the mouths of the river, and by the international arrangement of 1890 the river from the coast to the confluence of the Shiré is recognised as being in Portuguese territory; west of that point it forms the boundary between British and Portuguese territory as far west as Zumbo, 450 miles from the sea; farther west it passes through territory under British influence, its early course being, however, in Portuguese territory. The Zambesi and its affluents are now free to the flags of all nations.

Zamia (zā'mi-a), a genus of plants, nat. order Cycadaceæ. The species are found in tropical America, at the Cape of Good Hope, and in Australia, and partly resemble palms, partly tree-ferns. *Kaffir-bread* is a common name for the genus in South Africa, where the central part of the stem pith of *Z. Caffra* is formed into cakes, baked, and eaten by the natives.

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Zamora (thȧ-mō'rȧ), a city in Spain, capital of the province of the same name, 182 miles northwest of Madrid, on the right bank of the Douro. Pop. 16,283.

Zanesville (zānz'vil), the county town of Muskingum Co., Ohio, situated on the Muskingum River, 142 miles south of Cleveland. Its notable buildings include the court-house, Athenæum, and the Soldiers' and Sailors' Memorial Hall. It is in a coal and iron country and is largely engaged in manufacture, having three large encaustic and mosaic tile works, woolen, cotton, and hosiery factories, large tube works, glass works, railroad shops, etc. It is an active trade center of a large agricultural district. Pop. 28,026.

Zangwill (zang'wil), ISRAEL, novelist, born of a Jewish family in London in 1864. He was graduated from London University, and became a journalist. He is widely known for his tales of Jewish life, *Children of the Ghetto*, *Ghetto Tragedies*, and *The King of Schnorrers*. He has also written *The Master*, *Without Prejudice*, etc.— His brother LOUIS (born 1869), is the author of *A Drama in Dutch*, *The World and a Man*, etc.

Zante (zän'te; ancient, *Zacynthus*), one of the Ionian Islands, is 25 miles long, and about 12 miles broad; area, 277 square miles. The greater part of the interior consists of a fertile and productive plain, almost covered with the dwarf grape which produces the so-called currants; also olives, almonds, oranges, and wine. The staple export is currants. Destructive earthquakes, causing great loss of life and property, occurred in February, March, and April, 1893. Pop. 46,032. ZANTE, the capital, is a considerable seaport on its east side. Pop. 14,650.

Zanzibar (zän-zi-bär'), a sultanate of East Africa, which formerly comprised the whole coast between Magdishu (Magadoxo), about lat. 2° N., and Cape Delgado, lat. 10° 42′ S., with the four islands of Zanzibar, Pemba, Lamu, and Mafia. The continental part of the sultanate has recently become part of British East Africa and German East Africa; while the island and town of Zanzibar, and the island of Pemba, are entirely under British protection. The island (area, 600 sq. miles) is very fertile and well cultivated, being especially suited for the cultivation of cloves, sugar, coffee, cocoa, and various spices, of which there is a considerable export. The population (200,000) is extremely heterogeneous, including Europeans, Arabs, half-caste Portuguese from the Malabar coast of India, and the Suahilis from the mainland.— ZANZIBAR, the chief town, on the west side of the island, is the center of trade for the eastern seaboard of Africa, and of missionary and exploring work of the interior. At the instance of the British government the slave trade has been abolished and slavery restricted in Zanzibar. Pop. about 35,000.

Zara (zä'rȧ), an Austrian seaport, capital of Dalmatia, lies on the Adriatic, 130 miles southeast of Trieste. It is an old town, with interesting mediæval relics. Its chief industry is the preparation of the well-known liqueur maraschino. Pop. 32,551.

Zarathustra. See *Zoroaster*.

Zarskoje-Selo. See *Tsarskoye-selo*.

Zea (zē'a; ancient *Ceos*), one of the Cyclades, in the Ægean Sea, 14 miles from the coast of Attica; 13 miles long, and 8 broad. It is fertile, producing fruit, wine, honey, and valonia. Pop. 5019, most of whom belong to Zea, the capital.

Zealand (zē'land), or SEELAND, the largest of the Danish islands, separated from Sweden by the Sound and from Funen by the Great Belt; length, 81 miles, breadth, 65. It produces large crops of corn, and has excellent pasture. It contains the capital of Denmark, Copenhagen.

Zebra (zē'bra), the *Equus* or *Asinus zebra*, a quadruped of Southern Africa, nearly as large as a horse, white, striped with numerous brownish-black bands on the head, trunk, and legs, except on the belly and inside of the thighs. The zebra is extremely difficult to approach, from its watchful habits and great swiftness of foot. Only in a few instances has it been domesticated. The name has been sometimes applied to the now extinct quagga and the dauw or Burchell's zebra; but they differ from the zebra in having no stripes on the lower limbs, while those on the body are not so black as the true zebra's. See *Dauw*, *Quagga*.

Zebu (zē'bū), a ruminant of the ox tribe, the *Taurus Indicus* or *Bos Indicus*, called also Brahman bull. This quadruped differs from the common ox in having one, or more rarely two, humps of fat on the shoulders, and in having eighteen caudal vertebræ instead of twenty-one. It is found extensively in India, and also in China, Japan, and Africa. Zebus are used as beasts of draught and burden, and occasionally for

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riding. Their flesh is eaten as an article of food, especially the hump, which is esteemed a great delicacy.

Zebu (*Taurus Indicus*).

Zebu. See *Cebu*.

Zebulun (zeb'ū-lun), the tenth son of Jacob, and gave his name to one of the twelve tribes of Israel, and to a region of Palestine. At the first census the tribe numbered 57,400, and 60,500 at the second. The territory of the tribe lay in the fertile hilly country to the north of the plain of Jezreel, and included Nazareth.

Zechariah (zek-a-rī'â), or ZACHARIAH, the eleventh of the minor prophets, is supposed to have been born in Babylon, and to have been in the first detachment of the exiles who returned to Jerusalem under Zerubbabel and Joshua. He began to prophesy in the second year of Darius Hystaspes, and with his senior contemporary, the prophet Haggai, contributed powerfully by his appeals to the rebuilding of the temple (Ezra, vi, 14). Chapters i–viii of the prophecies of Zechariah, are generally admitted to be his composition. But the two other sections of the book into which critics and commentators have divided it, chapters ix–xi and xii–xiii, have been ascribed by many to a pre-exilic author, partly because both what is said and is not said in them is regarded as irreconcilable with a post-exilic one.

Zedekiah (zed-e-kī'â), the last king of Judah of the line of David. When he was twenty-one years of age Nebuchadnezzar appointed him to succeed his nephew Jehoiachim (whom he carried to Babylon) as king of Judah. He took an oath of allegiance to Nebuchadnezzar, which he afterwards broke by entering into an alliance with Egypt. His conduct in so doing was denounced by the prophet Jeremiah, who, as well as Ezekiel, then in Chaldæa, predicted the approaching fall of Jerusalem, which was besieged by Nebuchadnezzar and taken, B.C. 588. Zedekiah, whose sons were killed in his presence, had his eyes put out, and was carried to Babylon, which city was probably the place of his death.

Zedoary (zed'ō-a-ri; *Curcuma Zedoaria*), a plant of the order Zingiberaceæ, distinguished, like ginger, for the stimulating and aromatic properties of the root. It is a native of India and China. The roots of several other species are sold under the same name.

Zeebrugge (zē-brug), a port in Belgium which became of great importance during the European war, when it became a base for submarines during the German occupation of Belgium. In April, 1918, it was the scene of a daring raid undertaken by British naval forces, with the co-operation of French destroyers. Six obsolete cruisers, filled with concrete, were convoyed under smoke curtains and sunk or blown up at the entrance of the channel leading to the submarine basin. The raid was undertaken in conjunction with one on Ostend, also in German hands, and here two block ships were run ashore and blown up.

Zeeland (zē'land), ZEALAND, or SEELAND, the most westerly province of Holland, has the greater part of its surface below the sea-level, and protected by dikes. The soil is fertile, producing rich crops of wheat, flax, and hemp, and much dairy produce is exported. The capital is Middleburg. Area, 690 square miles. Pop. 227,292.

Zemindar (zem-in-dăr'), in India, the title of a class of officials created under the Mogul government of India. They have been regarded, first, as district governors; second, as landed proprietors; and third, as farmers or collectors of the government revenue on land. At the present day, in Bengal, the zemindar has all the rights of a British landed proprietor, subject to the payment of the land-tax, and also to a certain ill-defined tenant-right on the part of tenants who have long held possession of their farms.

Zenana (ze-na'na), the name given to the portion of a house reserved exclusively for the females belonging to a family of good caste in India.

Zend, an ancient Iranian language, in which are composed the sacred writings of the Zoroastrians. It is a member of the Aryan family of languages, and very closely allied to Sanskrit. See next article.

Zend-Avesta (zend-a-ves'ta), the collective name for the sacred writings of the Guebers or Parsees, ascribed to Zoroaster, and reverenced as a bible, prayer-book, and sole rule of faith and practice. It consists of several

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divisions, of which the oldest is written in the primitive Zend language. This partly consists of *gâthâs* or songs, some of which may contain the actual words of Zoroaster, and are valuable as containing the doctrines he taught. An English translation of the Zend-Avesta has been published.

Zengg (zeng), a seaport town of Austria, on the Adriatic. Pop. 3182.

Zenith (zen'ith), the vertical point of the heavens at any place, that is, the point right above a spectator's head, and from which a line drawn perpendicular to the plane of the horizon would, if produced, pass through the earth's center, supposing the earth a perfect sphere. Each point on the surface of the earth has therefore its corresponding zenith. The opposite pole of the celestial horizon is termed the *nadir*. (See *Nadir*.) The zenith distance of a heavenly body is the arc intercepted between the body and the zenith, being the same as the co-altitude of the body.

Zenjan (zen-jän'), a town of Persia, in the province of Irak-Aejmi, with manufactures of carpets, woolen cloths, and arms. Pop. 15,000.

Zeno (zē'nō), emperor of the Eastern Empire from 474 to 491 A.D. He is represented as depraved and incapable. One of the chief events of his reign, which was full of vicissitudes, was the permission given by him to Theodoric to dethrone Odoacer, which led to the establishment of the Ostrogothic kingdom in Italy.

Zeno, OF CITIUM, in Cyprus, where he was born, founder of the Stoic school of philosophy, flourished in the first half of the third century B.C. Settling in Athens he attached himself to various philosophical sects in succession, until he instituted a doctrine of his own. He taught in the Stoa, a porch adorned with the pictures of Polygnotus, whence his followers were called Stoics, and were sometimes designated 'disciples of the porch.' His writings are all lost. In his ethical system the nature of moral obligation was recognized as unconditional, virtue as the only good, and vice, not pain, as the only evil. Developed by his successors, Stoicism became the creed of the noblest of the Romans until Christianity was generally accepted. (See *Stoics*.) The date of his death is uncertain.

Zeno, OF ELEA, an early Greek philosopher, is supposed to have been born about the beginning of the fifth century B.C. He taught philosophy at Athens, and Pericles is said to have been one of his pupils. He was a favorite disciple of Parmenides, and is introduced as discussing philosophy with his master in Plato's dialogue of that name. He sought to recommend Parmenides's doctrine of the one by controverting the popular belief in the existence of the many.

Zenobia (ze-nō'bi-a), Queen of Palmyra, was the wife of its king Odenathus, and accompanied him both in war and in chase. Gallienus, in return for his services, acknowledged Odenathus as emperor, and when her husband was murdered, 267 A.D., she assumed the sovereignty, conquered Egypt, and called herself Queen of the East. Her ambition provoked the emperor Aurelian to make war on her, and after a stubborn resistance she fell into his power (273 A.D.) and was obliged to grace his triumph. She was allowed to pass the remainder of her life as a Roman matron. Zenobia was a woman of great courage, beauty, and linguistic accomplishments, and her studies were directed by Longinus (which see).

Zeolite (zē'ō-lit), a generic name of a number of minerals which fuse under the blowpipe. They are hydrated double silicates, of which the principal bases are aluminum and calcium.

Zephaniah (zef-a-nī'a), the name of one of the books of the Bible, the work of the ninth in order of the minor prophets, who lived in the reign of Josiah, and who probably uttered his prophecies some time between 630 and 624 B.C. The subjects of his prophecy are the temporary desolation of Judea, the destruction of the Philistines, Moabites, Ammonites, Assyrians, etc., and the promise that God will effect the restoration and felicity of a righteous remnant.

Zephyr, ZEPHYRUS (zef'ėr, zef'i-rus), the west wind and poetically, any soft, mild, gentle breeze. The poets personify Zephyrus, and make him the most mild and gentle of all the sylvan deities.

Zeppelin (tsep'pe-lin), FERDINAND COUNT, aviator, was born at Constance, Baden, in 1838. He entered the army, was an officer of cavalry in the Franco-German war, and afterwards rose to the rank of lieutenant-general. He subsequently became an enthusiast in aviation, building dirigible, power-driven air-shops, and making many experimental flights. His first ascent was made at Bern in 1892, and in 1900 he was able to remain an hour in the air. In subsequent years he built a succession of very

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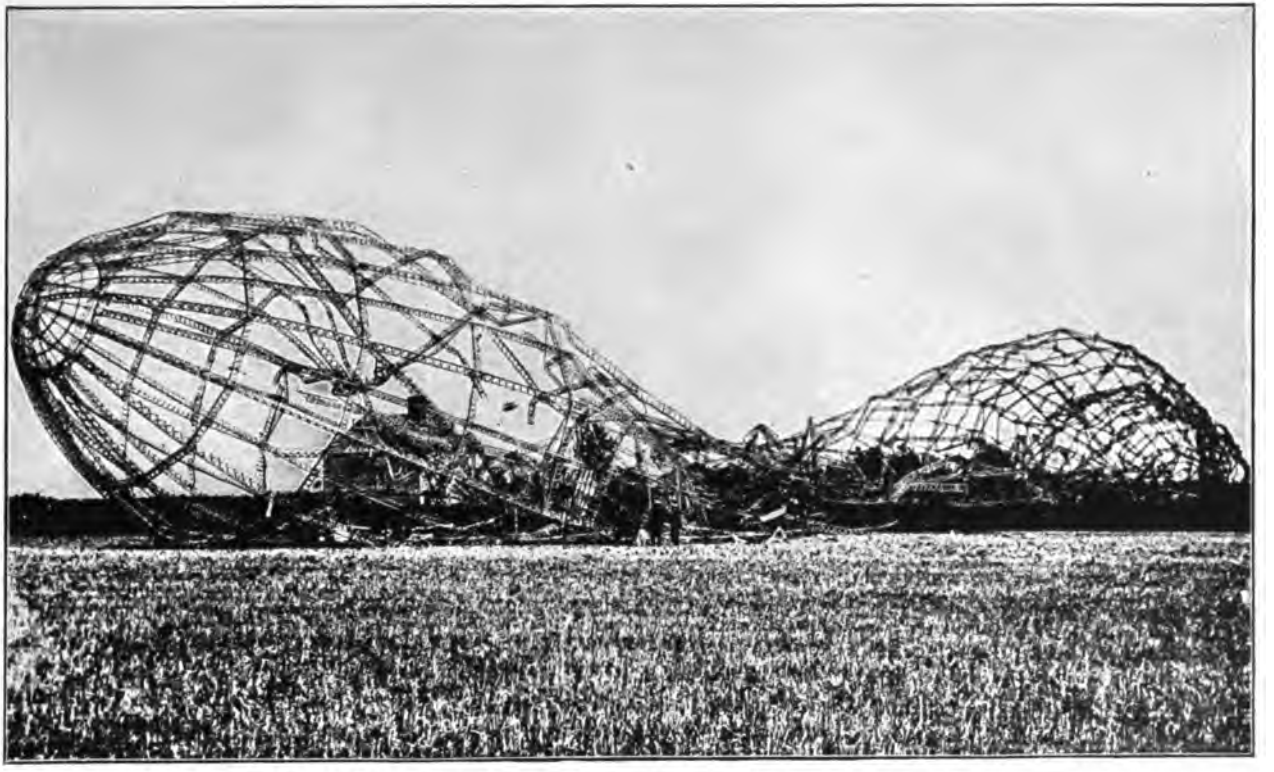

A WRECKED ZEPPELIN

The airship came down in England without injury to its crew of twenty-two men. They set fire to the gas bags before surrendering.

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large cigar-shaped balloons and made long journeys, but met with serious disasters, several of his great airships being destroyed. A fund contributed largely by the German nation enabled Count Zeppelin to continue his experiments, and he threw himself enthusiastically into the development of his ideas. The results were happy; he produced a number of huge dirigibles which were capable of sustained flights. When the war broke out in 1914 the imagination of the German people was fired by the prospect of a fleet of Zeppelin airships hurling death and destruction upon the enemy. The war-Zeppelin became an actuality. It was armed and carried bombs, but proved inadequate to cope with the anti-aircraft guns and the speedy seaplanes and aeroplanes. Super-Zeppelins were constructed on models prepared by the count a short time before he died. One of these, the L 33, fell into the hands of the British in the fall of 1916 and the wreck covered over an acre of ground. It was 680 feet long, displaced 50 tons weight of air, contained two million cubic feet of gas, and is said to have cost $1,750,000. The Zeppelin had been the vessel destined by the Germans to strike terror to the heart of England, but the perfecting of the anti-aircraft gun and the speedy armored aeroplane destroyed the effectiveness of the huge Zeppelins. Subsequent German air raids on Great Britain were carried out by the heavier-than-air fliers, which presented less of a target for the gunners on land and in the air. As a weapon of aggressive warfare the Zeppelins proved unsatisfactory. The capture and destruction of many of these airships was a severe blow to Count Zeppelin and the German people, who had placed the most extraordinary hopes in them. In 1863 Ferdinand Zeppelin visited the United States and fought with the Union troops in the Civil war. St. Paul, Minn., claims the distinction of being the town where young Zeppelin made his first ascent in a balloon. Count Zeppelin died March 8, 1917.

Zerafshan (zer-af-shan'), a river in Central Asia, which flows westward past Samarkand, and becomes lost in the neighborhood of the Amoo-Daria, west of Bokhara. Its length is from 400 to 500 miles.

Zerbst (tserpst), a town in the German duchy of Anhalt, on the Nuthe, 21 miles southeast of Magdeburg, is the seat of various manufactures; iron-founding is carried on; and there are several breweries. Pop. 17,095.

Zerda (zer'da), the fennec (*q. v.*).

Zerdusht. See *Zoroaster.*

Zermatt (zer-mät'), a village famous as a tourist center, in the canton of Valais, Switzerland, at the foot of the Matterhorn. Elevation 5315 feet.

Zero (zē'rō), in physics, any convenient point with reference to which quantitatively estimable phenomena of the same kind are compared; such as the point of a graduated instrument at which its scale commences; the neutral point between any ascending and descending scale or series, generally represented by the mark 0. In thermometers the zero of the Centigrade and Réaumur scales is the freezing point of water; in Fahrenheit's scale, 32° below the freezing point of water. (See *Thermometer.*) *Absolute zero* is −273° C., or 273° C. below the freezing point of water, at which temperature any given body is supposed to contain no heat.

Zerrahn (tser-rän'), CARL, German-American musical conductor, born at Malchow, Mecklenburg, in 1826. He settled in Boston in 1848, and was conductor of the Handel and Haydn Society from 1854 to 1895. During this time Boston owed much of its good music to his efforts and enthusiasm.

Zetland. See *Shetland.*

Zeuglodon (zū'glo-don), an extinct genus of marine mammals, regarded by Huxley as intermediate between the true cetaceans and the carnivorous seals. They belong to the Eocene and Miocene, and *Z. cetoides* of the Middle Eocene of the United States attained a length of 70 feet.

Zeulenroda (tsoi-len-rō'da), a town of Central Germany, principality of Reuss-Greiz. Pop. 9419.

Zeus (zūs), in mythology, the supreme divinity among the Greeks; the ruler of the other gods; generally treated as the equivalent of the Roman Jupiter. He was the son of Cronus and Rhea, brother of Poseidon (Neptune) and Hera (Juno), the latter of whom was also his wife. He expelled his father and the dynasty of the Titans, successfully opposed the attacks of the giants and the conspiracies of the other gods, and became chief power in heaven and earth. See *Jupiter.*

Zeuss (tsois), JOHANN KASPAR, born in 1806; died in 1856; a native of Bavaria, may be said to have founded Celtic philology with the publication in 1853 of his great work, the *Grammatica Celtica.* In his later years he was a professor at the Bamberg Lyceum.

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Zeuxis (zūk'sis), a celebrated Greek painter, who flourished about 420-400 B.C., and latterly lived in Ephesus. He belonged to the Asiatic school of painting, the distinguishing characters of which were accurate imitation and the representation of physical beauty. One of his most famous works was a picture of *Helen*. He was a contemporary of the painter Parrhasius.

Zibet, ZIBETH (zib'et), *Viverra zibetha*, an animal of the same genus as the civet cat. It is found in Eastern Asia, and in some of the larger islands of the Indian Archipelago. It secrets an odoriferous substance which resembles that secreted by the civet. It is often tamed by the natives of the countries where it is found, and it inhabits their houses like a domestic cat. See *Civet*.

Zif, ZIPH, the second month of the Jewish sacred year, extending from the new moon in May (or according to some rabbis in April) to that in June.

Zilleh (zē-le'; ancient *Zela*), a town of northeastern Asia Minor, 39 miles southwest of Tokat; with some manufactures, and an annual fair attended by from 40,000 to 50,000 persons. Pop. 20,000.

Zimapan (sē-mā-pān'), a town of Mexico, state of Hidalgo, with gold, silver, and lead mines. Pop. (commune) 15,000.

Zimmermann (tsim'ėr-mān), JOHANN GEORG, an eminent physician and miscellaneous writer, was born in 1728 at Brügg, in the Swiss canton of Bern. At the University of Göttingen he studied under and was befriended by Haller, and eventually was appointed public physician to his native town. He became famous in his profession, and published several works on miscellaneous subjects, with one on *Experience in Medicine*, which procured him the appointment of physician for Hanover to George III. The loss of his wife and other domestic calamities brought on an attack of hypochondria, from which a second marriage relieved him, and as a result of his recovery he produced his once celebrated treatise on *Solitude* (1784), by which out of his own country he is alone remembered. In 1786 he attended Frederick the Great in his last illness, about whom he published two works, one of them *Conversations with the King*, which involved him in painful controversy. Eventually he became mentally deranged, and died in 1795. His *Autobiography* was issued in 1791.

Zinc, a metal, frequently called *spelter* in commerce; chemical symbol Zn; atomic weight 65. It has a strong metallic luster and a bluish-white color. Its texture is lamellated and crystalline, and its specific gravity about 7. It is hard, being acted on by the file with difficulty, and its toughness is such as to require considerable force to break it when the mass is large. At low or high degrees of heat it is brittle, but between 250° and 300° F. it is both malleable and ductile, and may be rolled or hammered into sheets of considerable thinness and drawn into wire. Its malleability is considerably diminished by the impurities which the zinc of commerce contains. It fuses at 773° F., and when slowly cooled crystallizes in four- or six-sided prisms. Zinc undergoes little change by the action of air and moisture. When fused in open vessels it absorbs oxygen, and forms the white oxide called *flowers of zinc*. Heated strongly in air it takes fire and burns with a beautiful white light, forming oxide of zinc. Zinc is found in the United States; also Britain, Austria, Germany, Belgium, Italy, etc. It does not occur in the native state, but is obtained from its ores, which are chiefly the sulphide, or *zinc-blende*, and the carbonate, or *calamine*. The oxide of zinc (ZnO) is a fine white powder, insoluble in water, but very soluble in acids, which it neutralizes, being a powerful base of the same class as magnesia. It combines also with some of the alkalies. Several of the salts of zinc are employed in medicine and the arts; as the sulphate, which is used in calico printing, and in medicine as an astringent, a caustic, an emetic, and a tonic; the oxide and the carbonate, used as pigments, etc. Sheet-zinc is largely employed for lining water cisterns, baths, etc., for making spouts, pipes, for covering roofs, and several other architectural purposes. Plates of this metal are used as generators of electricity in voltaic batteries, etc.; they are also employed in the production of pictures, etc., in the style of woodcuts. (See *Zincography*.) Zinc is much employed in the manufacture of brass (see *Brass*) and other alloys, and in preparing galvanized iron. See *Galvanized Iron*.

Zinc-blende, native sulphide of zinc, consisting essentially of sulphur and zinc, but often containing a considerable proportion of iron. See *Zinc*.

Zincography (zing-kog'ra-fi), an art in its essential features similar to lithography, the stone

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printing-surface of the latter being replaced by that of a plate of polished zinc. A form of this art called anastatic printing is described under *Anastatic*.

Zinc-white (ZnO), oxide of zinc, a pigment now largely substituted for white-lead as being less liable to blacken on exposure; but it has not an equal covering power.

Zingarelli (dzen-ga-rel'lē), NICCOLO ANTONIO, an Italian composer, born in 1752. After much success as a composer, both of operas and of sacred music, in 1804 he was appointed chapel-master of the Sistine chapel in Rome, and on refusing to compose a *Te Deum* on Napoleon I making his son king of Rome, he was arrested and taken to Paris, but was immediately liberated and pensioned by the emperor, who was a great admirer of his music. When he died in 1837 he was director of the Royal College of Music at Naples, and chapel-master of the Neapolitan Cathedral. Among his chief operas were *Montezuma* and *Romeo and Juliet*.

Zingis Khan. See *Genghis Khan*.

Zinzendorf (tsin'tsen-dorf), NICHOLAS LUDWIG, COUNT VON, founder of the community of Moravian Brethren, or Herrnhuters, was born at Dresden in 1700. After studying law at Wittenberg, and several years of foreign travel, he resolved to settle down as a Christian land-owner among a pious tenantry, and while carrying out this intention he worked assiduously in coöperation with congenial friends at creating a revival of religion in the Lutheran Church. Having given an asylum on his estate to some persecuted religionists from Moravia, and built for them the village of Herrnhut, he settled among them, and by degrees established there a common worship, and a missionary and industrial organization based on the family, not on the monastic, system. This association became known throughout the world as the Moravian Brethren (which see). To the extension of its influence Zinzendorf devoted his fortune and his energies, visiting in the course of his journeys England and America. He died in 1760.

Zinziberaceæ (zin-zi-ber-ā'se-ē), ZINGIBERA'CEÆ, a nat. order of plants, of which the genus *Zinziber* (ginger) is the type. The species are all tropical plants, or nearly so, the greater number inhabiting various parts of the East Indies. They are generally of great beauty through the development of their floral envelopes and the rich colors of their bracts; but they are chiefly valued for the sake of the aromatic and stimulating properties of the rhizome or root, found in ginger, galangal, zedoary, cardamoms, etc.

Zion (zī'on), a mount or eminence in Jerusalem, the royal residence of David and his successors. See *Jerusalem*.

Zionism (zī'on-izm), a movement which has for its object the establishing of a Jewish state in Palestine. The founder of the modern 'back-to-Zion' movement was Dr. Theodore Herzl of Vienna, who in 1896 proposed that Palestine should be purchased from the Sultan of Turkey, and that a Jewish autonomous state should be founded under Turkish suzerainty. A Zionist congress was held at Basel, Switzerland, in August, 1897. The statement of aims adopted by 200 delegates, representing Jews of all nationalities, began: 'Zionism aims at establishing for the Jewish people a publicly recognized and legally secured home in Palestine.' Israel Zangwill, English author and playwright, took a prominent part in the Zionist movement. The conception of an autonomous Jewish state in Palestine met with little practical encouragement from the Turks. The capture of Jerusalem by the British in the fall of 1917 has given the Zionists new hope. Mr. Arthur J. Balfour, Foreign Minister of Great Britain, indorsed the principle of Zionism officially. He wrote: 'The government view with favor the establishment of Palestine as a national home for the Jewish people and will use their best endeavors to facilitate the achievement of this object.' The Federation of American Zionists comprises 140 societies. The headquarters are in New York.

Zircon (zer'kun; ZrO_2, SiO_2), a mineral, silicate of zirconium, originally found in Ceylon, and forming one of the gems, being met with either colorless or colored—red, brownish, green, etc. Hyacinth and jargon are varieties.

Zirconia (zer-kō'ni-a; ZrO_2), the oxide of zircon, a hard white solid, 'sticks' of which are sometimes used in the oxyhydrogen flame instead of lime.

Zirconium, the metal contained in zircon and certain other rare minerals; symbol Zr; atomic weight 90. It appears to form a link between aluminum and silicon.

Zirknitz (tserk'nitz), or CZIRKNICZ, a lake of Austria, in Carniola, 30 miles E. N. E. of Trieste, about 5 miles long and between 2 and 3 broad, without surface-outlet. It is remarkable for the occasional disappearance of its

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waters for weeks and even months, during which its bottom is often covered with luxuriant herbage.

Ziska (zis'ka), JOHN, leader of the Hussites, was born about 1360 in Bohemia. He joined as a volunteer the Knights of the Teutonic Order, and fought against the Poles, as also with the Hungarians against the Turks. He is also said to have fought on the English side at the battle of Agincourt. He threw in his lot with the militant reformers who took arms after the martyrdom of Huss and Jerome in Bohemia. and became their leader; established himself at Mount Tabor, which he fortified, and where a town grew up occupied by his followers, who took the name of Taborites. He died in October, 1424.

Zither, Zithern (tsit'ėr, tsit'ėrn), a stringed musical instrument consisting of a sounding-box pierced with a large circular sound-hole near the middle, the strings, to the number of thirty-one in the more perfect forms of the instrument, being made of steel, brass, catgut, and silk covered with fine silver or copper wire, and tuned by pegs at one end. Five of the strings are stretched over a fretted keyboard, and are used for playing the melody, the fingers of the left hand stopping the strings on the frets, the right-hand thumb armed with a metal ring striking the strings. These strings, which are tuned in fifths, have a chromatic range from C in the second space on the bass staff to D on the sixth ledger-line above the treble. All the remaining strings, called the accompanying strings, are struck by the first three fingers of the right hand, and being unstopped produce only the single tone to which they are tuned. The instrument is played on a table with the keyboard nearest the performer.

Zittau (tsit'ou), a town of Saxony, in the district of Bautzen, on the Mandau, 48 miles E. S. E. of Dresden, is the center of the manufacture of mixed cotton and woolen stuffs in Saxony; manufactures also woolens, cottons, trimmings, etc., and has bleach-fields, dye-works, machine-works, tile-works and potteries, royal institute of glass-painting, etc. There are a number of lignite mines worked in the vicinity. Pop. 34,706.

Zlatoust (zla-tō-öst'), a town of Russia, government of Ufa, among the Ural Mountains, on the banks of the Ai, which supplies with motive power the crown iron-works. It has manufactures of swords, bayonets, firearms and ordnance. Pop. 20,973.

Znaim (tsnīm), a town of Moravia, on the Thaya, has manufactures of earthenware, leather, chocolate, etc. Here in 1800, after the battle of Wagram, an armistice was concluded between Napoleon I and the Archduke Charles. Pop. 16,261.

Zoan (zō'an), the Tanis of the Greeks and Romans, an ancient Egyptian city, on the right bank of what was the Tanitic bank of the Nile, now only a canal. It was probably the residence of the Pharaoh of the Exodus, and consequently the scene of the 'marvelous things' that were done 'in the field of Zoan' (Ps. lxxviii, 12). The temple was one of the grandest in Egypt. Its ruins, buried under mounds, have been explored, and one of the chief curiosities found in them is the Canopus stone, with a trilingual inscription, like that on the Rosetta stone, hieroglyphic, demotic, and Greek, recording a decree of Egyptian princes assembled at Canopus B.C. 254.

Zoantharia (zō-an-thā'ri-a), an order of the class Actinozoa, represented by the sea-anemones and by the great bulk of the coral-polyps.

Zodiac (zō'di-ak), an imaginary belt or zone in the heavens, extending about 9° on each side of the ecliptic. It is divided into twelve equal parts called signs. It was marked out by the ancients as distinct from the rest of the heavens because the apparent places of the sun, moon, and the planets known to them were always within it. This, however, is not true of all the planets. See *Ecliptic.*

Zodiacal Light (zō-di'a-kal), in astronomy, a luminous tract of an elongated triangular figure, lying nearly on the ecliptic, its base being on the horizon, and its apex at varying altitudes, seen at certain seasons of the year either in the west after sunset or in the east before sunrise. It appears with greatest brilliance within the tropics, where it sometimes rivals the Milky Way. The most plausible hypothesis respecting it is that it consists of a continuous disc, probably of meteors revolving round the sun.

Zoea (zō-ē'a), the name given to an embryonic stage in the development of crustacea (which see).

Zoetrope (zō'e-trōp), an optical toy, which exhibits pictures of objects as if endowed with life and activity. It is of interest as a forerunner of the principle perfected in the kinetoscope, which has completely replaced it. Each shows pictures of objects, giving different phases of attitudes and made to run together by passing before the eye in quick succession.

Zoilus (zō'i-las), a rhetorician of ancient Greece, born at Amphip-

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olis, chiefly remembered for the asperity of his criticisms on the poems of Homer. The time at which he lived is uncertain — probably the third century B.C. His name is used proverbially as that of a captious or snarling critic.

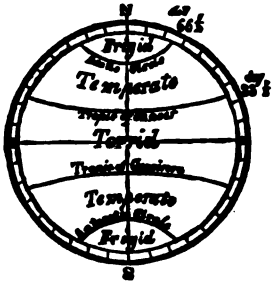
Zola (zō'la), EMILE, a French novelist, born in 1840, the son of an Italian engineer. After working for Paris publishers and writing for the press he attempted fiction with some success. He first became generally known by commencing, in 1871, the famous series of novels entitled *Les Rougon Macquart Histoire Naturelle d'une Famille sous le Second Empire.* They were based on a theory that it is the duty of the modern novelist to depict human life, in all grades of society, exactly as it is, omitting and softening nothing, however repulsive and disgusting. Zola carried out this theory so effectually that English translations of several of these novels are not allowed to be sold. One of the series, *L'Assommoir*, portraying the evil consequences of drunkenness, was dramatized by Charles Reade as 'Drink,' and became popular. Among his later and more attractive works are *Lourdes* (1894); *Rome* (1896), and *Paris* (1898). In 1897 he condemned the course adopted by the government in the Dreyfus case and was tried for libel during his absence and sentenced to fine and imprisonment. He escaped this penalty by remaining abroad until after the revision of the Dreyfus trial. He died Sept. 29, 1902.

Zollverein (tsol'vèr-in), the German customs union, the precursor of the present German Empire, founded in 1827, and afterwards greatly extended through the efforts of the government of Prussia. Its principal object was the establishment of a uniform rate of customs duties throughout the various states joining the union. The territories of the Zollverein now coincide with those of the German Empire, and include also Luxembourg.

Zombor (zōm'bōr), or SOMBOR, capital of the Hungarian county of Bács-Bodrog, on a canal which unites the Theiss and Danube, about 120 miles south of Budapest, is the center of the corn and cattle trade of an extensive district. Pop. 29,036.

Zonaras (zon'a-ras), JOANNES, a Byzantine historian, flourished in the twelfth century. His chief work is the *Chronicon*, a history extending from the creation of the world to A.D. 1118. Of the events of his own time his account is meager; but his works contain valuable fragments from lost writings of earlier historians.

Zone (zōn), (1) in geography, one of the five great divisions of the earth, bounded by circles parallel to the equator, and named according to the temperature prevailing in each. The zones are: the *torrid zone*, extending from tropic to tropic, or 23½° north and 23½° south of the equator; two *temperate zones*, situated between the tropics and polar circles, or extending from the parallel of 23½° to that of 66½° north and south, and therefore called the *north temperate* and *south temperate* zone respectively; and two *frigid zones*, situated between the polar circles and the north and south poles. (See *Climate.*) (2) In natural history, the name is given to any well-defined belt within which certain forms of plant or animal life are confined; as the different belts of vegetation which occur as we ascend mountains.



Zones of the Earth.

Zooid (zō'oid), in biology, an animal organism, not independently developed from a fertilized ovum, but derived from a preceding individual by the process either of fission or gemmation.

Zoölatry (zō-ol'a-tri), animal worship; adoration paid by man to any of the lower animals. This cult seems to have passed through three stages: (1) The animal was reverenced and propitiated as possessing a power greater than that of man. (2) The animal was regarded as an incarnation of some deity or spirit. (3) It was raised to the position of a tribal ancestor.

Zoölogical Garden (zō-ō-loj'i-kal), a public garden in which a collection of animals is kept. The gardens of the Zoölogical Society, Regent's Park, London (familiarly termed 'the Zoo'), founded in 1828, are probably the finest of the kind in the world. They belong to the Zoölogical Society of London, which was founded in 1826. Of the other chief zoölogical gardens, the Jardin des Plantes in Paris is the oldest, having been founded in 1794. Gardens

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of this kind form a popular resort in the larger American cities.

Zoölogical Stations, stations or centers which have of late years been established in various parts of the world for the study of zoölogy. The Stazione Zoölogica at Naples, founded mainly in Dohrn in 1872, is of an international character. Other institutions of the same kind on a smaller scale have been established in various parts of France, United States, Italy, Russia, etc.

Zoölogy (zō-ol'ō-ji; Gr. *zōon*, an animal, and *logos*, discourse), that science which treats of the natural history of animals, or their structure, physiology, classification, habits, and distribution. The term 'natural history' has been frequently used as synonymous with zoölogy; but such a term is obviously of wider signification, and should be used to indicate the whole group of the natural sciences. Zoölogy is a branch of biological science, constituting, in fact, with its neighbor branch, botany, the science of biology. Its study comprehends such branches as the *morphology of animals*, or the science of form or structure, which again includes *comparative anatomy*, by which we investigate external and internal appearances, the positions and relations of organs and parts; the *development of animals*, which treats of the various stages leading from the embryonic to the mature state; the *physiology of animals*, which includes the study of the functions of nutrition, reproduction, and of the nervous system; *classification* or *taxonomy*, which assigns to the various individuals their proper place in the scale of life. A new department has been added in recent times, sometimes called *etiology*, which investigates the origin and descent of animals, or treats of the evolutionary aspect of zoölogical science. Various systems of classification have been framed by zoölogists. Linnæus divided the animal kingdom into six classes, viz., Mammalia, Birds, Fishes, Amphibia, Insects, and Worms (Vermes). Cuvier proposed a more scientific arrangement. He divided the animal kingdom into four subkingdoms, viz., Vertebrata, Mollusca, Articulata and Radiata. Modern classifications have been based chiefly on morphological characters, with the addition of the study of cellular embryology, and the facts of heredity and adaptation. They have been very largely influenced by the theory of evolution, which has induced many naturalists to arrange animal forms as nearly as possible on the lines of descent from which they are believed to have originated. Among those who have modified the classification of Cuvier may be noted Lamarck, Ehrenberg, Owen, Milne-Edwards, Von Siebold, Leuckart, Agassiz, Huxley, Haeckel, Müller, Dohrn, Ray Lankester and others. Professor Huxley recognizes the following subkingdoms: Vertebrata, Mollusca, Molluscoida, Annulosa, Annuloida, Cœlenterata, Infusoria and Protozoa. Haeckel's classification gives the broad divisions — Vertebrata, Arthropoda, Echinodermata, Mollusca, Vermes, Zoöphyta and Protozoa. There are more recent systems, some of which are far more elaborate than those given. That of Ray Lankester may be instanced. These systems agree in dividing the animal kingdom into the subkingdoms of Protozoa (single-celled animals) and Metozoa (many-celled animals). The latter include Porifera (sponges), Cœlenterata (polyps, medusæ, etc.), Echinodermata (star-fish, sea-urchins, etc.), Arthropoda (crustaceans, insects, spiders, etc.), Mollusca (shellfish), and Vertebrata (fishes, batrachia, reptiles, birds and mammals).

Zoophyte (zō'o-fīt; Gr. *zōon*, an animal, and *phyton*, a plant), the name given by Cuvier to any member of his sub-kingdom Radiata. It is now loosely applied to animals of extremely low organization which present many external resemblances to plants.

Zoospore (zō'os-pōr), a spore occurring in cryptogamic plants, which, having cilia or long filiform moving processes projecting from its surface, moves spontaneously for a short time after being discharged from the spore-case of the parent plant.

Zoospores.

Zoorita (thō - rē'ta), Geronimo, a Spanish historian, born in Estramadura in 1512; died in 1581. He was made a member of the supreme council of Castile in 1543, was afterwards sent as an embassy to Germany, and in 1549 was appointed historiographer of the kingdom. His principal work, *Annals of the Crown of Aragon*, enjoys a high reputation.

Zorilla (zō-ril'la), a small mammal of South Africa (*Ictonyx zorilla*), related to the badgers and the American skunks. Like the latter, it secretes a liquid having a very offensive odor, which it can discharge to a considerable distance. Its glossy fur is black in color, with white bands and spots.

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Zoroaster (zō-rō-as'ter; Old Persian *Zarathustra*, later Per. *Zerdusht*), one of the great religious teachers of the East, the founder of what was for centuries the national religion of Persia, and is still adhered to by the Parsees. He has been represented by eminent authorities as purely mythical, but it seems more reasonable to believe that he was a real and historical personage. If this view be accepted, he was probably a native of the east of Iran, but there is great uncertainty as to the time in which he appeared as a religious teacher. He is supposed by some to have been a contemporary of Moses, by others his date is assigned to the tenth century before Christ. His doctrines are to be found in the Parsee scriptures called the *Zend-Avesta* (which see), and the *Gâthâs*, which is the oldest part of that work, are declared to contain his authentic utterances. The fundamental idea of his doctrine was the existence, since the beginning, of a spirit of good, Ahurô Mazdaô (Ormuzd), and a spirit of evil, Angrô Mainyush (Ahriman). These two are in perpetual conflict, and the soul of man is the great object of the war. Ormuzd created man free, so that if he allows himself to fall under the sway of Ahriman he is held to be justly punishable. When he dies his good and evil deeds will be weighed against each other, and accordingly as the balance is struck will be sent to heaven or to hell. If they are exactly equal, the soul passes into an intermediate state, and remains there until the day of judgment. Ormuzd is to triumph ultimately, and then there will be one undivided kingdom of God in heaven and on earth. The religion of Zoroaster, when it became that of Iran, was expounded by a widely-spread priesthood, and these provided for it a ritual and ceremonial. Minutely elaborated laws for the purification of soul and body were laid down. They included a prohibition of the burning or the burying of the dead bodies of believers, which, by the Parsees in Bombay and elsewhere, are still left to be devoured by vultures. See *Fire-worship*, *Guebres*, *Parsees*.

Zorrilla y Moral (thō-rēl'ya ē mō-ral'), Don José, a Spanish dramatist and poet, born at Valladolid in 1817. He was intended for the law, but devoted himself instead to literary pursuits. In 1841 he published *Songs of the Troubadours;* this was followed by a collection of *Historical Legends and Traditions;* several volumes of poems, comedies, etc., all of which were very popular. He died in 1893.

Zosimus (zos'i-mus), a Greek historian, who held an official post at Constantinople during the first half of the fifth century A.D. He was a pagan, and in his history of the then empire he severely criticised the Christian emperors, representing the substitution of Christianity for paganism as largely responsible for the decline of the empire.

Zouaves (zwāvz), originally mercenaries belonging to a Kabyle tribe. The Zouaves in the pay of the Dey of Algiers were, when Algeria became a French possession, incorporated with the French army there, preserving their Arab dress. Ultimately the native element was eliminated, and the Zouaves became merely French soldiers in the picturesque Arab costume. As such they distinguished themselves in the Crimea and the Franco-Italian war of 1859.

Zschokke (tshok'kė), Johann Heinrich Daniel, a German author, born at Magdeburg in 1771; died in 1848. He settled in Switzerland, in which country he held an honored position in connection with education and public affairs, and with the press. His autobiography, several of his tales, and the 'Hours of Devotion' (*Stunden der Andacht*), have been translated into English.

Zschopau (tsho'pou), a town of Saxony, on a river of same name, 6 miles southeast of Chemnitz; has important manufactures of woolens, cottons, etc. Pop. 6748.

Zucchero (dzuk'e-rō), or Zuccaro (dzuk'a-rō), Taddeo and Federigo, two brothers, Italian painters of the sixteenth century, were chiefly noted in their own country for their fresco-paintings. Federigo, the younger of the two, came to England in 1574, and received commissions to paint the portraits of high personages, among them those of Queen Elizabeth and Mary Queen of Scots. His portrait of the latter was engraved by Vertue.

Zug (tsōk), a central and the smallest undivided canton of Switzerland, bounded by Zürich, Schwyz, Lucerne, and Aargau; area, 92 square miles. The surface, mountainous in the southeast and south, where the Rossberg occupies the frontier, slopes more or less gradually north and west, till it becomes comparatively flat. The only lakes deserving the name are those of Zug and Egeri. The climate, rigorous in the mountainous districts, is mild on the lower south slopes. The chief exports are cattle, fruits, cider, and 'kirsch-

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wasser.' Area, 92 square miles; pop. 25,026.—ZUG, the capital, stands on the north shore of the lake, is 12 miles northeast of Lucerne, with which and with Zürich it is connected by railway. Pop. 6508.—LAKE of ZUG, or ZUGERSEE, chiefly in the canton of Zug, 9 miles long north to south, and in breadth from 3 miles to 1 mile. The shores are low in all directions except the south and southeast. In the former direction the Rigi and in the latter the Rossberg rise in lofty precipices, presenting scenery of a grand description. The lake has a maximum depth of 650 feet. The fishing, principally pike and carp, is productive. Also famous for a peculiar kind of trout locally called *Röthelli*.

Zuider Zee (zoi'dėr-zā; or ZUYDER; South Sea), a gulf of the North Sea, on the coast of Holland; 80 miles long, 40 miles greatest breadth. It was formerly a lake, but was united with the German Ocean by inundations in the twelfth and thirteenth centuries. The islands Texel, Vlieland, Terschelling, Ameland, etc., separate it from the North Sea, with which it communicates by various channels, the principal one being between Helder and Texel. It is very shallow, and to avoid the difficulties of its navigation to Amsterdam the North Sea Canal was constructed. In 1914 the government lent its support to plans for the construction of a dike twenty miles wide across the mouth of the Zuyder Zee, thus reclaiming a large area of fertile land; estimated cost, $80,000,000.

Zuinglius. See *Zwingli*.

Zululand (zō'lō-land), a South African territory northeast of Natal, now a British possession; area, 10,461 square miles. It is bounded by the Tugela, which divides it from Natal, by the Indian Ocean, by Tongaland, and on the northwest by the Transvaal. It has a coast line of 210 miles. The southern portion of the country consists chiefly of undulating plains, covered with grass, and thinly wooded. The coast region is flat, marshy, and very unhealthy. The inland region is healthy and rich in tropical productions, containing large forests. The Zulus are a warlike Kaffir tribe, and for a time were formidable to the colonists of Natal, possessing an organized army of considerable numbers. In 1879, under their king Cetewayo, they came into conflict with the British. (See *Cetewayo*.) At first the war was unfortunate for the British (a body of troops having been annihilated at Isandula), but in July, 1879, a general engagement took place at Ulundi, where the power of the Zulus was quite crushed. The subsequent British reorganization of Zululand did not work successfully, and in 1882 Cetewayo was restored, a strip of country adjacent to Natal being constituted as a 'reserve.' Into this reserve Cetewayo fled in 1883, after being defeated by a hostile Zulu chief, Usibepu, and there he died in 1884. However, Cetewayo's son, Dinizulu, assisted by Transvaal Boers, vanquished Usibepu, and drove him into the reserve. Ultimately the Boers took possession of a considerable portion of the country, while the remaining portion of Zululand, with the reserve, was annexed to Britain in 1887. Zululand is now a province of the Natal state. Pop. estimated at 230,000.

Zulus (zō'lōz), a branch of the great Bantu division of the African people which is notable for the physical and mental development of its members. They are organized as a pure democracy, their chiefs being elected and holding office during the pleasure of the people. They have a very complete though unwritten code of laws, and as a race are conspicuous for their morality and freedom from drunkenness and crime. See *Zululand*.

Zumbo (zum'bō), a town of South Africa, near the confluence of the Loangwa with the Zambesi; lat. 15° 37′ 2″ S.; lon. 30° 32′ E.; 450 miles from the mouth of the Zambesi. It marks the western point of the Portuguese territories on the Zambesi; has an advantageous site; was formerly the seat of an important trade, and contained a number of substantial buildings; but of late trade was neglected, and the town fell into decay.

Zumpt (tsumt), KARL GOTTLOB, born in 1792; died in 1827; professor of Roman literature in the University of Berlin, produced several excellent editions of Latin classics, and a valuable and elaborate Latin grammar, of which there have been several English translations.

Zurbaran (thoor-bà-rân'), FRANCISCO, an eminent Spanish painter, born in Estramadura in 1598; died in 1662. He studied under Juan de Roelas at Seville, producing there many of his best works. Among these his *St. Thomas Aquinas* is held to be one of the most admirable paintings ever produced in Spain. There are some of his works in the galleries of Paris, Berlin, Dresden and Munich. He was eminently successful in his treatment of the Spanish friar, his favorite subject,

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and he was remarkable for his richness of coloring, chiaroscuro and exquisite representation of velvets, brocades and white draperies. He received the title of painter to Philip III, and was patronized by Philip IV.

Zürich (tsü'rih; ancient, *Turicum*), a town of Switzerland, capital of the canton of the same name, is beautifully situated at the northern end of the lake of Zürich, on both sides of the Limmat, and having on the west the Sihl, which joins it immediately below. It has a university and a polytechnic school, both occupying handsome buildings, a Romanesque cathedral of the eleventh–thirteenth centuries, town-hall, public library, etc. Its most considerable industry is that of silk, but its cotton-spinning and manufacture of locomotives and machinery are also important. Its inhabitants are mainly German-speaking Protestants. Pop. (including suburbs), 205,000.—The canton holds the second place in the Swiss confederation as regards population. It is one of the northern cantons, and extends from the lake of the same name to the Rhine, to which its waters are carried by the Thur, Töss, Glatt, and Limmat. It is highly cultivated, and the land held by no fewer than 36,000 proprietors. There are extensive manufactures of silk and cotton goods. Area, 655 square miles. Pop. 431,637.

Zürich, LAKE OF, or ZURICHERSEE, lies chiefly in the canton of Zürich, but partly in Schwyz. Its greatest length is about 27 miles; while its greatest breadth does not exceed 3 miles, and its greatest depth 600 feet. Its scenery is distinguished not so much for grandeur as for beauty. A considerable traffic is carried on upon the lake by means of sailing vessels and a number of steamers. It is well supplied with fish. Its chief feeder is the Linth Canal, communicating with the Wallenstatter-see. It discharges itself at the town of Zürich by the Limmat.

Zürich, TREATY OF, signed there November 10, 1859, by the plenipotentiaries of France and Austria, embodied the conditions of the preliminaries of peace agreed to at Villafranca, on the part of Napoleon III and the Emperor of Austria, Francis Joseph, and closed the Franco-Italian war by Austria's abandonment of her right to Lombardy.

Zutphen (zut'fen), a fortified town of Holland, in the province of Gelderland, 20 miles by rail south of Deventer, has an active trade, especially in timber and grain. It is notable as being the scene of the death of Sir Philip Sidney, who was killed before its walls in 1586. Pop. 19,000.

Zuyder Zee. See *Zuider Zee.*

Zvornik (zvor'nĕk), a fortified town of Bosnia, on the Drina. Pop. 3500.

Zweibrücken (tsvī'bruk-ĕn; Latin, *Bipontium;* French, *Deux-Ponts*, two-bridges), a town of Bavaria, in the Palatinate, pleasantly situated on the Schwarzbach; has manufactures of velvet, plush, cotton fabrics, machinery, etc. The edition of the classics known by the name of 'Bipont' was published here. Pop. 14,711.

Zwickau (tsvik'ou), a town of Saxony, 60 miles w.s.w. of Dresden, with several fine churches, notably St. Mary (1453-1536), restored 1884; the fine Gothic 'Gewandhaus' (1522), now a theater; town-house, government buildings, etc. The railway-station is one of the largest in Germany. Zwickau has manufactures of linen and cotton goods, dyes, and chemical products, etc.; productive coal mines in the vicinity employ over 8000 men. Pop. (1913) 75,542.

Zwinger (tswing'er), THEODORE, an eminent Swiss scholar and physician, was born at Bâle in 1533; died in 1588. He became professor of Greek at Bâle, and published *On the Rural Method of Cato and Varro* and a collection of anecdotes entitled *Theater of Human Life.* His son and several of his grandsons were noted for various acquirements.

Zwingli (tsving'lē), or (as it is often Latinized) ZUINGLIUS, ULRICH, the Swiss reformer, was born in the canton of St. Gall, where his father was a thriving peasant proprietor. Intended for the church, he studied at various places, during a second residence at Basel becoming the pupil and friend of Thomas Wyttenbach, a reformer before the Reformation, and from him learned the evangelical doctrines which he afterwards promulgated with signal success. His first overt revolt against the Roman Catholic system was when he was a priest at Einsiedein (1516), which a supposed miracle-working image of the Virgin had made a favorite resort of pilgrims. So effectively did he denounce pilgrimages as superstitious that his sermons were talked of in Rome, and it is said futile offers of promotion were made to coax him into silence. In 1518 he was appointed preacher in the cathedral of Zürich, where he opposed a preacher of indul-

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gences. Then followed other denunciations of Roman Catholic practices and doctrines, until Zürich, the authorities of which supported Zwingli, and the people of which adhered to him, became thoroughly Protestant, and adopted a reformed theology, worship, and discipline. Zwingli went further than Luther, whose doctrine of consubstantiation led to what proved on the whole a resultless conference on the subject between him and Luther and Melanchthon at Marburg in 1528. In 1531 the Forest Cantons, which adhered to the Roman Catholic faith, made war upon Zürich, whose troops Zwingli accompanied as chaplain. While in the thick of an engagement at Kappel, near Zürich, he was mortally wounded, October 11, 1531.

Zwirner (tswēr'ner), Ernst Friedrich, a German architect, born in Silesia in 1802; died in 1861. He was appointed architect of the ancient Cologne Cathedral in 1833, and spent many years in its restoration and completion. His work is considered a highly admirable and successful example of restoration.

Zwittau (zwit'ą), a town of Austria-Hungary, in the extreme north of Moravia, circle of Olmütz, 40 miles N. of Brünn. It is a seat of the textile industry and has manufactures of tobacco, etc. Pop. 9029.

Zwolle (zwol'lē), a town of Holland, capital of the province of Overijssel. It is a well-built town, with fine suburbs and a fine church (St. Michael's), with a famous organ. Zwolle communicates with the sea by means of the Willemsvaart Canal. Among its industries are shipbuilding, cotton manufacture, tanning, rope-making, etc. Three miles from the town is the monastery of the Agnetenberg, where Thomas à Kempis spent most of his life. Pop. (1913) 33,836.

Zwyndrecht (zwīn'drekt), a commune of Belgium, in East Flanders, 17 miles N. E. of Dendermonde, in the Scheldt. Pop. about 5000.

Zygæna (zī-gē'na), or Hammer-headed Shark. See *Shark*.

Zymotic Diseases (zī-mot'ik), a name applied to epidemic and endemic, contagious diseases, because they are supposed to be produced by some morbific principle acting on the system like a ferment (Greek *zymē*). This morbific principle or poison gets into the blood in minute particles or germs, which there increase and multiply, the disease lasting until the poison has become worked out, or has been destroyed. Among these diseases are measles, scarlet fever, smallpox, typhus, typhoid, diphtheria, whooping-cough, croup, erysipelas, etc.

Zygophyllaceæ (zī-gō-fil-lā'se-ē), an order of hypogynous exogens, containing about a hundred species of herbaceous plants, trees and shrubs, found in the hottest parts of both hemispheres. There are seven known genera, of which the most important is Guaiacum (which see). The abundance of species of Zygophyllum and some other genera constitutes a most striking feature of the North African and Arabian deserts. The flowers of *Z. fabago* are employed as a substitute for capers, and are known as bean-capers.

Zythum (zī'thum), a kind of beer used by the Egyptians; applied also to the beer of the northern nations; a liquor made from malt and wheat.

Zyrnayovsk (zir'na-yovsk), a mining town in a rich silver-producing district of Semipalatinsk, near the southern border of Siberia. It lies among the slopes of the Altai Mountains, on a head-stream of the Irtish River. The Zyrians of the vicinity, a Tartar tribe, are Shamanists, and live by hunting in the forests. Pop. about 5000.

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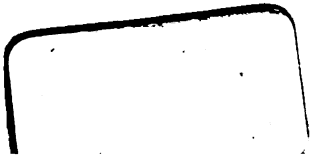

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